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XXIII.—AGRICULTURE IN SIERRA LEONE.

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Mr. Sampson attended the Second West African Agricultural Conference, held in the Gold Coast in October, 1929, at the request of the Secretary of State for the Colonies and with the concurrence of the Empire Marketing Board. He was enabled, also, to visit The Gambia, Sierra Leone, and in addition to undertake a tour in Nigeria. The following account of agricultural matters in Sierra Leone is the outcome of his tour in that Colony and Protectorate.

A. W. H.

Except in the matter of the cultivation of wet-land rice, the agriculture of Sierra Leone is more primitive than that of any of the other British West African Colonies. This is, I imagine, largely due to the rainfall; for it is not easy for primitive races to develop a permanent type of dry-land farming under conditions of such heavy rainfall.

Throughout the Protectorate, except where modified by peculiar local conditions, the general method of agriculture is much the same. It consists of cutting and clearing forest growth for temporary clearings. At the commencement of the rainy season these clearings are sown with hill paddy. A small proportion of guinea corn and millet is sown with the paddy while frequently one sees scattered plants of *Phaseolus lunatus* which are trained up erections made of poles that have been saved when the clearing was made. A small admixture of perennial cotton is sometimes sown, and cassava may also be planted. The cotton gives no crop in the first season, and since no cultivation is given to the clearing except the preparatory hoeing when the seed is sown, it has to compete with the secondary forest growth and annual weeds which spring up on the land. In the next year a fresh clearing is made. It can thus be seen that the present method of farming is progressively destructive. As virgin forest land becomes scarcer, resource has to be had to old clearings which have been allowed to revert to "bush." As the interval between successive clearings becomes shorter, so the fertility of the land decreases and the size of the holdings tends to become larger, until in some areas one sees land which now grows chiefly grass, and on which very little forest growth survives.

The cultivation of wet-land rice in the Scarcies area is of great interest and promise. I have not seen better rice farming anywhere in Africa. I was informed that this method of rice cultivation was of recent origin, but in the appendix to the report delivered by the Court of Directors of the Sierra Leone Company in 1794 and based on two reports made to them by Mr. Afzelius, their Botanist, it is stated that "on the plains of the Bulam shore and other such tracts, it (rice) grows as luxuriantly as in Carolina." This seems to indicate that even at this early date rices which could withstand wet conditions were being grown.

The Scarcies rice is grown under real wet-land conditions. The area available, however, is limited. The rice fields are found on land adjacent to the river above where it is influenced by salt water during the rainy season, and as far up the rivers as these are flooded at high tide. Along the lower reaches the land has been reclaimed from Mangrove swamp and is a rich black loam. The soil is peculiar in that when the tide is out and the fields are drained, it is quite possible to walk on the land without sinking in, though at the same time the soil is quite soft and a stick can be driven into the mud with the greatest of ease. The upper reaches of this rice area are not so rich and the land is much more difficult to work. It is only flooded at spring tides and in consequence weeds are liable to get the upper hand. One sees large mounds of weeds dotted among the rice fields, which show what an amount of care is taken by the people to keep their crops clean. Nowhere are any attempts made to enclose water in the fields by the aid of earthen bunds, as is done in all rice areas in the East. If this were done it is probable that not only would heavier yields be obtained, especially on the upper reaches of this rice area, but the difficulties on account of weed growth would be greatly lessened since very few weeds can survive if they are kept completely submerged. The only form of field enclosure to be seen consisted of reed fences built along the river bank. These are made in order to keep out fish which are said to feed on the young rice stalks and thus damage the crop. The people are fully conversant with the methods and advantages of transplanting their crops, and make their nurseries on elevated lands behind the rice areas. It is probable, however, that much could be done to improve the raising of seedlings, and this is necessary as the resulting rice crop is greatly influenced by the quality of the seedlings in the nursery. There is evidence that the people are not entirely satisfied with their existing varieties of wet-land rice. This was shown by the several new varieties which they have obtained, and their constant search for new ones. One, which was produced by a rice grower whom we met, was procured from a few grains of paddy which he found in a gin case. Judging by the large amount of red rice seen in all varieties, they could quickly be improved by selection, and as soon as a station is started this should be one of its first duties. The results would be immediate, and would give the people confidence in the work of the Department.

There are signs of the extension of wet-land rice cultivation along both banks of the Lokko Creek and Estuary, as well as along the banks of the Bagru river towards Sembehun, and on the lower reaches of the Bum river, above the region affected by salt tidal water and below that where the high floods of the rainy season prevail. Wet-land rice is also finding its way into cultivation in the small inland swamps and valleys, and this extension is being fostered by the Administration. Everywhere there is evidence that the people are taking, or will take, an interest in wet-land rice cultivation. This is a most encouraging sign, as the first interest of any Agricultural Department is to attend to the proper food requirements of a country. The assurance of an ample food supply not only lowers the cost of living, but enables the people to take an interest in the production of money crops, the profits of which supply them with the means of purchasing other requirements, whether they are essential or otherwise. This inland swamp cultivation is of quite recent origin and it is encouraging to see that the people have in addition, and of their own initiative, seen the value of these swamps for the dry season cultivation of sweet potatoes. It is hoped that the Agricultural Department may be able to develop this use of the land in the dry season.

In the upper reaches of the estuary of the Bum river is to be seen yet another type of agriculture. It is not at present extensive though there seems ample scope for development. Here are to be seen very extensive areas of tall swamp grass country. These are level lands which during the rains are inundated with from six to fourteen feet of water, but in the dry season they are above flood level. Attempts are being made by the people to grow root crops such as sweet potatoes and cassava on these lands. From all appearances these soils are extremely rich in organic matter and it is possible that there is scope for a further development in the cultivation of these and other garden and vegetable crops.

Sierra Leone bears a striking resemblance to the South Kanara district of Southern India. Not only is the climate and rainfall very similar but the soils also resemble each other very closely. The South Kanara district, besides running up into the Western Ghats, comprises all the wide undulating plain between these and the Indian Ocean, and when one sees Sierra Leone one can almost visualise how the present day agriculture of that part of India has developed.

South Kanara is at present a very prosperous district. Its main crop is wet-land rice. Including double crop land there are annually nearly half-a-million acres under cultivation. Including the Ghats area the district comprises about 2,500,000 acres, and carries a population of about one and a quarter million. Rice is the principal agricultural export from the district and as long ago as 1882 this export was valued at £175,000. I have not more recent figures with me. The forests cover 25 per cent. of the district, and 50 per

cent. consists of hills and waste land. Most of the remainder is under cultivation with rice and garden crops.

Sierra Leone closely resembles what I imagine to have been the state of South Kanara several hundred years ago. There is no doubt that hill paddy was at one time an important crop in that part of India. It is grown to the present day under special regulations in certain sparsely populated parts of the district, and in much the same way as hill paddy is grown in Sierra Leone, though for the protection of its forest cover general cultivation of hill paddy is not now allowed. As forest areas degenerated, however, the productive power of such hill or dry lands decreased and the stress of population must have forced people to develop wet-land rice cultivation. This stage is now being reached in Sierra Leone and as time goes on one may expect to see less dry-land areas under crop and much more attention paid to the inland valley swamps.

The development of these river valleys in South Kanara, which presumably were once similar to the valley swamps of Sierra Leone, is instructive. In the first instance, one can imagine that the people were content to cultivate only the flat lands in the valley, but as time went on it was found necessary to increase the wet-land rice areas and so the lower and more fertile slopes of these valleys were terraced and the fields thus made were bunded to hold up water. The upper fields made in this way are entirely dependent on the rain that falls and on surface flood water from the upper slopes. These are the first lands to be planted after the rains commence, as they are the most uncertain. The valley lands immediately below them are next planted, and lastly the lowest lands in the valley. By thus spreading out the planting and the harvesting season a much greater production is possible from the labour available.

In South Kanara the question of maintaining the fertility of these inland valley rice fields must at one time have been acute, for there exists a customary law in that country that the hill land, adjoining the valley rice fields as far as the watershed of the valley, is the property of the owner of the rice land. This law has arisen doubtless from the custom universal throughout the Peninsular of manuring rice lands with leafy branches collected from waste lands and from the jungle. Unregulated cutting of such leaves will quickly destroy forest growth and the source of such manure; and thus the very wise course was adopted of making the owner of the rice lands responsible in his own interests for maintaining a forest cover on the hillsides by not over-cutting. The result has been that the hillsides adjoining rice lands are maintained as small private forest reserves, except the lower and more level lands which are often utilised for growing domestic, and possibly economic, crops. The method of utilising these forest leaves is peculiar to that part of India and has been evolved presumably to save forest growth. If forest leaves were cut only at the season of the year when the rice crop was being planted, forest cover would be seriously damaged, for

this is just at the end of the dry season when there is very little new leaf growth. The people, therefore, have adopted a practice of collecting a few head-loads of leaves daily throughout the year and of using these for bedding down their cattle, which are housed at night in loose boxes. At short intervals these leaves are removed from the loose box and are made into manure heaps, which are situated either adjoining the cattle shed or on a raised area adjoining the rice fields, the manure being carried there in large basket head-loads. This practice has anticipated the discovery of methods recently devised of making "artificial" farm-yard manure.

As regards the economic crops which are grown in that district there is little that is applicable to Sierra Leone. Such crops were developed at a time in the history of India when the country was entirely dependent on internal markets. Areca nuts and black pepper are the most important crops grown for sale, though there are also domestic crops such as coconuts, fruits, turmeric, sugar cane, ginger, etc. Sierra Leone, with the world as its market, has a distinct advantage as regards crops which can be grown supplementary to rice.

One result of the development of wet-land rice in the South Kanara district has been that in the more populous parts practically all forest vegetation on the hillsides has now disappeared, except where the private reserved forests exist. This has been caused by cattle grazing, collecting leaves for manure, and collecting thatching grass. To all intents and purposes it is communal land and every one gets all he can out of it. The cultivated area represents only about one-sixth of the total area of the district. Much of the valley rice lands carry two crops a year, the second crop being irrigated by putting temporary brushwood dams across the streams. In spite of this low proportion of cultivated area, the district is most prosperous and supports a population of nearly 300 to the square mile.

This description of a part of India may seem to be out of place, but I have given it as it illustrates the evolution of an agricultural country which is very similar to Sierra Leone, and the problems which have been met there will doubtless arise in Sierra Leone as the country develops.

Though wet-land rice is likely to become of increasing importance in Sierra Leone, both as a domestic crop and as a crop which can be exported to other parts of West Africa, it is doubtful whether it will be able to compete on the world's markets with that of other rice-producing countries, which have greater facilities for cheap production. There are no really large areas where production can be concentrated and where a water supply can be assured as there are in India, Burma, and Indo-China. Though not lessening the importance of this crop to the country, yet it seems essential that other types of farming should also receive attention, and that, in addition to work on rice, the Agricultural Department should investigate the possibilities of a permanent form of arable dry land farming

in lieu of the existing system of shifting cultivation, and should also extend the work which has been started at N'jala of seeing what permanent plantation crops it is possible to introduce.

Permanent arable farming.

In a country having such heavy and concentrated rainfall one of the first lines of investigation would be to devise methods of working the land so as to prevent soil erosion. I am of opinion that much of what is called soil exhaustion in West Africa is really due to soil erosion. In the more heavily farmed areas of lesser rainfall which occur in the Gambia, in the Northern Territories of the Gold Coast, and in Nigeria, one finds that everywhere the natives have adopted a system of ridge and furrow cultivation and that these invariably follow the contour of the land. They are not continuous, but are broken at intervals. This method of cultivation not only holds up rain water and allows it to soak in, but it checks any tendency there is for heavy rain to form runoffs and streams. One comes across a somewhat similar practice in East Africa, where it is frequently the custom to throw the field up into contiguous mounds on which the crop is planted. This ensures that surface water has no means of forming straight runoffs. In spite of this one finds that where the stress of population on the land is not too great—here usually some system of manuring is adopted—land is generally allowed to revert to “bush” in order to recoup its fertility. There is no doubt that lack of soil aeration and depth of cultivation has much to do with the so-called loss of soil fertility. The question of the maintenance of soil fertility has received much attention in recent years by the Agricultural Department of Nigeria and the knowledge gained there would be of value to Sierra Leone, though the methods adopted might not be found altogether applicable to the higher rainfall conditions which prevail.

As regards crops which could be grown under such a system of farming, it would be necessary to introduce some intensively farmed crop into a rotation, to which it would be worth while applying manure. Ginger is already cultivated to some extent in the Protectorate and doubtless its cultivation could be considerably extended, provided that, by better methods of cultivation, a better quality of produce could be secured. It should also be possible to grow chillies as a rain-fed crop which would ripen its fruit after the end of the rains, and there would appear to be a satisfactory market in West Africa for this commodity, if a good class of chillie could be grown. There is a possibility that cotton might be developed as a dry land crop, though it is doubtful whether the quantity produced would ever be more than sufficient for local consumption. It is not an ideal cotton country. There is too sudden and marked a change from the rainy to the dry season. Some of the single plant strains which are being grown at N'jala appear to be worth going on with, but several show signs of being contaminated by Allens Long Staple. These should be at once rejected as it is essential to obtain strains

which are immune to jassid attack. Tobacco is also a crop which might do well on the more sandy soils of the Protectorate, but I hesitate to suggest this at the present stage of development of agriculture in the country, for if grown on a field scale it requires better manurial treatment and more careful farming methods than those to which the people are accustomed.

For the cereal part of the rotation in addition to hill rice, *Eleusine coracana* is worthy of trial. There are some excellent varieties of this in East Africa. It is a cereal which can withstand heavy rain and, since it tillers freely and can also stand close planting, it might prove a better protection against soil erosion than hill paddy. Some of the small millets such as *Panicum miliare* and *P. miliaceum* might also be tried. These would very likely prove useful as catch crops if grown in the same way as *Digitaria exilis*.

Of the pulses *Phaseolus lunatus* is already extensively cultivated in the country. The form grown is very similar to that imported into Europe under the name of Madagascar beans and which generally fetch a good price. It might be worth while to try and raise strains of this selected for white colour, as this is considered of importance by the wholesale trade in this country. If such strains can be evolved there seems to be no reason why this pulse should not be more extensively grown for export. I would deprecate the introduction of seed from outside as the local variety seems to be devoid of purple coloration, which frequently detracts from the value of commercial samples received from Madagascar.

The pigeon pea is worthy of extension on better drained laterite gravel soils. It is grown under similar soil and climatic conditions in Western India and it is of value for local consumption. It would also be useful to collect varieties of Cowpeas from other parts of West Africa. There seem to be very few varieties in cultivation in this Protectorate. Something better could probably be obtained.

Root crops. There appears to be considerable scope for increasing the quantity of root crops grown in the country, but it is likely that these will only prove profitable on deeper and better classes of soils. The Agricultural Department have already done useful work in this direction and I was much impressed with the apparent demand that existed for "seed" of introduced yams, cassava varieties, etc., which are being grown at the small station attached to the Provincial Superintendent of Agriculture's headquarters at Makump. It is evident that the natives appreciate the importance of root crops in their diet.

Green manure crops. In order to maintain or develop, it is not clear which, the fertility of the soil, it may be necessary to introduce a green manure crop into the rotation. *Mucuna aterrima* has been found to be the most suitable crop for this purpose in Southern Nigeria and this was seen also in Sierra Leone. *Calopogonium mucunoides* has been introduced by the Agricultural Department and is being grown at N'jala as well as at other demonstration

stations. This makes excellent growth and produces a very complete cover. Thus for a green fallow and for the suppression of weeds it appears to be admirably suited. If a crop which will return some form of pulse is required, I would suggest the trial of *Phaseolus aconitifolius*, which is one of the smaller pulses of India.

There would seem to be, therefore, an ample variety of crops with which to institute some system of permanent arable farming, and if this could be combined with the use of cattle for draught purposes, a considerable addition to the manure supply would be obtained. Wood ash from the houses is always greatly valued in India on laterite soils as a manure, and its use in Sierra Leone should be considered, as besides adding to the fertility of the land it would improve the sanitation of the villages.

With regard to the use of draught cattle, I consider that very much more work must be done by the Agricultural Department before the use of ploughs and other implements of cultivation are advocated for the natives. The object of using draught animals is not only to break up the land more efficiently than can be done with the hoe, but to extend their use in the preparation of the seed bed, and, if necessary, for the after-cultivation of the crops. After seeing the work which is being done in this connection at Badkano, it appears to me that the areas ploughed for one man are too large. There is too much work involved in preparing the seed bed for sowing and in weeding the rice crop after it is up. I saw the rice crop on the area which had been ploughed last year and, even though it had been flooded since, the ground was still very rough and it was difficult to see the rice crop for weeds. For wet rice cultivation animals are used for ploughing, puddling and levelling, while for dry cultivation for ploughing, cultivating, clod crushing, harrowing, possibly ridging, and if necessary for intercultivation after the crop is established. It is this extended use of cattle which makes for efficiency and good farming and until this is accomplished it is difficult to see how the use of draught animals can be appreciated and brought into more general use. If they can once be brought into use and be owned by the people who cultivate the land, it will go a long way towards solving the question of the manure supply.

Permanent plantation crops.

There is a considerable collection of permanent plantation crops in existence at the N'jala Agricultural Station, but up to the present little use has been made of this material for experiment, beyond keeping records of yield of some of the more promising crops. There is scope for work in order to find out not only what will grow but how to grow it. Little has been done to ascertain what type of soils suits different crops, and, as much of the area of this farm is alluvium and not typical of the general soils of the Colony, conclusions drawn as to their suitability for more general cultivation may be misleading. Comparison between different varieties and species of crop have, as far as I could learn, never been made. There are at

least four different species of coffee being grown, but no definite experiment has been made to find out under what conditions of soil these thrive best nor how the one species compares in crop value with another. Certainly three of these are grown in close proximity to each other, but it happens that the site is on a slope showing considerable variations in soil types, while in some parts the behaviour of the tree is masked by the spread of bermuda grass. Another thing noticed about these coffees was the great variation in the size of the bean even among trees of the same species, while in some cases individual trees appear to form beans of varying size. I was unable to ascertain whether any commercial valuations of well-prepared samples of these coffees had ever been obtained. The Imperial Institute examined samples from Sierra Leone of *Stenophylla* coffee in 1924, but these did not appear to have been cleaned or graded as they contained peaberry, broken beans and pieces of husk. It seems very evident, therefore, that one of the first things to do in connection with coffee is to submit properly *cleaned and graded* samples of the different species and strains for valuation. I gather that the French firms in West Africa at present buy up all the *Stenophylla* coffee available on account of its superior quality, and since it is the native hill coffee of the country, and as it appears to thrive on less fertile soils than do other species, there appears to be scope for more detailed experiment with this species.

Oil palms. The trial of Southern Nigerian oil palms at N'jala shows great promise, and there is no doubt that these are much more vigorous than any of the local strains of this tree, besides which for a given weight of fruit they give a much greater quantity of Palm Oil. Whether this trial will ever lead to the formation of Oil Palm Plantations I do not know, nor whether the land tenures of the country would admit of large plantations, but even if this cultivation is only extended to native planting it is bound to be of great value to the country in filling a local demand for this product.

Coconuts. There appears to be considerable scope for the planting of coconuts for domestic consumption on the better drained soils adjoining wet rice lands, and it is possible that in time these will become a familiar feature of the landscape even in the interior along the alluvial slopes above the rice swamps, as well as on the alluvial soils on the upper reaches of those rivers which are not liable to high flood. The planting of coconuts on the sea coast such as has been attempted, both on the Bulam shore and on Turner's Peninsula where the soil is almost entirely sea sand containing the minimum of plant food, is not likely to succeed, and I suggest that no further official encouragement be given to this undertaking. Even in a country such as the Malabar coast of India where every available space is planted up with this tree, attempts to plant up such soils are very seldom made. I have never seen a successful plantation made on similar sands though individual trees adjacent to human dwellings may prosper. I myself have tried to make a plantation under such

conditions, but it has only been possible to make the trees grow by constantly supplying them with plant food in the shape of manure, and it can never be a profitable undertaking. Unless coconut trees are healthy they are likely to become a serious menace to other plantations. The attempts to induce natives to plant coconuts along the Bum river emphasised this. With the exception of one place, where the people had cultivated cassava among the trees and the ground had thus had cultivation and weeding, the trees were seriously attacked by scale. I put this down to the fact that the trees during the rainy season send their feeding roots to the surface and these are subsequently killed when the ground dries out in the dry weather, with the result that the trees are starved and become unhealthy.

Black pepper. This is a crop which I consider should have a favourable chance of becoming established in the Colony. The climate seems admirably suited to its cultivation, and it is a form of cultivation which brings in a good return for a small acreage. Prices have for the last few years been very high. The plant is very similar in habit to *Piper guineense* which occurs wild in the country. I am arranging to send a few plants out to the Agricultural Department in a Wardian case from Kew.

I cannot close this report without expressing my thanks to His Excellency the Governor, the Colonial Secretary, the Acting Director of Agriculture and his officers for their hospitality and for all the arrangements which were made for my comfort and conveyance through the Protectorate.

XXIV.—A NEW GENUS OF PROTEACEAE FROM NORTH QUEENSLAND. C. T. WHITE.

In the rain-forests of north-eastern Queensland, though the Malaysian element may predominate as regards genera, the degree of endemism among the species is fairly high, but perhaps the most peculiar feature of the flora is the development of a number of small (in some cases monotypic) genera among the Proteaceae as *Bleasdalea*, *Buckinghamia*, *Cardwellia*, *Carnarvonia*, *Darlingia*, *Hollandaea*, *Musgravea*, *Placospermum* and the one here proposed *Austromuelleria*.

Austromuelleria* C.T. White, gen. nov.

Flores hermaphroditi, regulares. *Perianthium* cylindraceum rectum, tubo gracili, limbo incrassato ovoideo, laminis concavis. *Stamina* ad basin laminarum affixa, filamentis latis perbrevibus, connectiva lato ultra loculos in apiculo producta. *Gynaecium* rectum, stylo gracili, stigmatibus oblongo-clavato, ovario sessili, glandulis hypogynis 3 liberis lineari-oblongis. *Fructus* ignotus.—Arbor.

* Commemorating the name of Baron Sir Ferdinand von Mueller; similar combinations are *Indokingia* and *Sinowilsonia* both of Hemsley.

PLATE VII



Austromuellera trinervia. 1, Leaves, $\frac{1}{2}$ nat. size. 2, Raceme, $\frac{1}{2}$ nat. size. 3, Flower $\times 3$. 4, Perianth segment $\times 7$. 5, Stamen $\times 15$. 6, Pistil $\times 5$.

Folia alterna, pinnata, foliolis trinerviis. *Flores* mediocres, geminatim pedicellati, in racemos longos densos simplices valde deflexos e ramulis infra folia orientes dispositi.

A. trinervia C. T. White, sp. nov.

Arbor mediocris, ramulis junioribus robustis pilis longis floccosis ferrugineis vestitis. *Folia* alterna, pinnata, rachide ferrugineo-pubescente ad 50 cm. longa, foliolis 12-19 petiolulatis, petiolulis 0.5-1 cm. longis, ferrugineo-pubescentibus, laminis 10-15 cm. longis, 2-3 -plo longioribus quam latis, ovato-lanceolatis, rectis vel falcatis, glabris, nervis ad basin exceptis, prominenter trinerviis, venis transversis et reticulatione utrinque prominulis. *Racemi* simplices, densiflori, deflexi e ramulis infra folia orientes, rachide cum pedunculo brevi ad 40 cm. longa, pilis ferrugineis velutinis vestita, pedicellis geminatis 1 mm. longis. *Perianthii* segmenta 2 cm. longa, pilis longis ferrugineis vestita. *Stamina* ad basin laminarum brevium affixa, filamentis latis perbrevibus, connectivo lato ultra loculos in apiculum producto. *Gynaecium* rectum, stylo gracili, in parte inferiore hirsuto, stigmatibus glabro oblongo-clavato, ovario sessili, glandulis hypogynis 3 glabris oblongo-linearibus 1 mm., longis.

NORTH QUEENSLAND. Boonjie, Atherton Tableland, Jan. 1923, C. T. White (sine no.).

In floral structure the present plant seems to come closest to *Orites*, but the leaves are totally different from anything else in the Proteaceae, and until fruit is known its position in the family must remain in doubt. I forwarded specimens to Dr. L. Diels, who is writing the Proteaceae for the new edition of the "Pflanzenfamilien," and he replied "The Proteaceous tree collected by you in 1923 near Boonjie is a puzzle to me. I have seen nothing like it. The inflorescence and flowers seem to be very similar to *Orites* incl. *Musgravea* but the leaves are extraordinary."

It is with some hesitation that I describe the plant as the type of a new genus, but since I collected it in 1923 I have asked various people to look out for further material without obtaining any, and I consider it desirable not to wait any longer in bringing such a remarkable tree under notice. *Austromuellera trinervia* is evidently a very rare tree, for Mr. S. F. Kajewski, a very careful observer, who recently spent some months in North Queensland on behalf of the Arnold Arboretum, tells me he only saw a very few trees in one locality near Boonjie and none of these unfortunately was in flower or fruit.

Specimens from the type gatherings have been placed in the herbaria at the Royal Botanic Gardens, Kew; Arnold Arboretum, Boston; Botanic Garden and Museum, Berlin-Dahlem; and Botanic Museum and Herbarium, Brisbane.

XXV.—ZOMBIANA, THE SUPPOSED TROPICAL AFRICAN MEMBER OF THE MYOPORACEAE.

J. HUTCHINSON.

In the *Flora Australiensis* (5 : p. 2) Bentham stated that the genus *Myoporum* was represented by a few species in the Indian Archipelago and the Pacific Islands, *and by one species in tropical Africa*. The reference to tropical Africa was evidently based on an unnamed specimen collected by Barter in West Africa and labelled in brackets "Myoporineae." Barter noted that the plant was a "small shrub, flowers red, among rocks in the river Avon, growing almost entirely in the water; Yoruba; Niger Exped. Barter no. 1143." The duplicates of Barter's collection were distributed from Kew, and a specimen bearing a copy of this legend was apparently sent to the Paris Museum.

Some time after the appearance of Bentham's note a dissection and drawing of the flowers was apparently made by Fitch and the true systematic position of the plant was ascertained. In 1888, Baillon, in his *Histoire des Plantes* (9 : 420), described under the name *Zombiana*, a supposed new genus of *Myoporeae*—a group which he treated as a series of *Scrophulariaceae*—and indicated that it came from West Tropical Africa. It is clear now that he misread the writing of the well-known place-name *Yoruba* as *Zomba*, the latter being a place-name unknown in West Africa.

So matters remained until the time arrived for dealing with the later *Gamopetalae* in the *Flora of Tropical Africa*. The identity of *Zombiana* was evidently a matter of speculation, for Bentham in the *Genera Plantarum* (2 : 1124) had remarked with reference to *Myoporum* "Benth. Fl. Austral. v. 2 (ubi errore species una Africae incola dicitur)." But Bentham omitted to say what had become of the specimen upon which he had based his former opinion. The *Myoporaceae* for the *Flora of Tropical Africa* were allotted to the late R. A. Rolfe, whose task was complicated by the disappearance of Barter's specimen from the covers of the family. It seems that enquiries were then sent to Paris, and a fragmentary specimen without flowers or fruits was returned to Kew. With this material and Baillon's description, Rolfe wrote out his account of the family for the *Flora*, "*Zombiana africana*" being the sole genus and species represented in the area. In a footnote he referred to Bentham's published notes (mentioned above) and to the fact that Dr. J. Briquet had studied the histology of the plant and suggested that it might belong to the *Selaginaceae* or *Verbenaceae*; but Rolfe remarked that the fruit did not agree with the former family, nor the position of the radicle with the latter. He made it clear that the generic name, derived from a place-name "*Zomba*"—not *Zomba* in Nyasaland—was apt to mislead, as the plant had been found only on the western side of the continent.

In taking up the matter for part 3 of the *Flora of West Tropical Africa*, I have now been able to solve the identity of the supposed

Myoporaceous plant. It is *Rotula aquatica* Lour. (*Rhabdia lycioides* Mart.), a widely spread Boraginaceous shrub. In the cover of that species in the Kew Herbarium I discovered the original Barter specimen, upon which Mr. N. E. Brown had rewritten the locality as the well-known Yoruba, near Lagos. Thus Tropical Africa still lacks the family *Myoporaceae*.

XXVI.—A NEW SPECIES OF EXORMOTHECA FROM SOUTH AFRICA. C. V. B. MARQUAND.

The subject of this note was received for identification from the Section of Plant Pathology, Division of Plant Industry, Department of Agriculture, Pretoria. It was reported to have been sent to Pretoria on several occasions, always in the same condition. Despite the fact that it is said to have been growing in soil that was moist throughout the year it is a remarkable example of a species capable of withstanding prolonged drought. Although the specimens had been collected in March, 1929, and were sent to Kew some months later completely dried up in a small box, the thalli immediately started to grow when the soil in which they were received was placed in a jar of water, and it was at first hoped that archegonia and antheridia might be developed and sporogonia might be produced. This hope, however, was not realized, but when another thallus, which had been dried up throughout, was tested twelve months after it was collected, it was found to be alive. When the living plant is viewed from above, the green colour of the body of the thallus is visible through the stomata, but in the dried state the hyaline stomata are whitish in colour. As the vegetative characters very definitely place it in the genus *Exormotheca*, while it is distinct from all previously described species of that genus in the very tall stomata, its publication from sterile specimens only may be justified.

Exormotheca megastomata Marquand sp. nov. ; affinis *E. africanae* Steph. sed thallo multo latiore pallidiore, squamulis non ciliatis inter alia differt.

Sterile. *Thalli* simple, scattered, 8–11 mm. long, 5–6 mm. wide, 4 mm. deep, ovate or shortly once dichotomously branched. *Dorsal surface* with a slight furrow or nearly straight, completely covered with stomata and the margins with closely invested scales. *Stomata* conical, about 2 mm. high, whitish, closely packed, forming an epidermis composed of a single layer of narrow rectangular thin-walled cells devoid of contents, supported by the thin-walled elongate-celled partitions seen in section. *Marginal scales* minute, multicellular, unistratose, trifid or quadrid, adpressed to the exterior stomata ; cells small, narrow rectangular, the upper ones hyaline, the lower cells with dark purple contents. *Assimilating layer* immediately below the stomata, not exceeding $\frac{1}{2}$ their height, composed of densely packed pillars of chlorophyllose cells 4–10 cells deep, the apical cell conical, rounded at the apex, lower cells



Exormothecha megastomata.

1. Transverse section of the thallus showing the stomata. In three of the stomata the osteole can be seen, $\times 15$.
2. Portion of dorsal surface in transverse section, showing the pillars of chlorophyllose cells and bases of supporting walls of the stomata, $\times 170$.
3. Portion of ventral surface of same showing the attachment of the rhizoids, $\times 170$.

rounded. Both this layer and the supports of the stomata arise from a narrow layer of small rounded cells without trigones which bounds the tissue filling the thallus. *Loose reticulate tissue* about 1.5 mm. in thickness, composed of rounded or ovoid empty cells varying in size, in reticulate chains with large air spaces, filling the main body of the thallus. Below the growing point this tissue is much denser, the air spaces are few or absent and the cells small. *Ventral surface* concave, carried up to the marginal scales of the dorsal surface in a hemispherical curve, composed of a very narrow layer of small round densely chlorophyllose cells with the rhizoids covering the whole surface. *Rhizoids* long, slender, pellucid, unicellular, with their deeply inserted bases enlarged, bulbous. *Ventral scales* O.

S. AFRICA. Transvaal : on krantz, 3 miles north of Middelburg, aspect southerly on soil which is moist all the year round, associated with *Encephalartos*, *Riccia*, etc., March and October, 1929, *Union Dept. Agric. Cryptogamic Herb.* 214 (type specimen in *Herb. Kew.*).

XXVII.—PLANTS NEW TO ASSAM: II.* C. E. C. FISCHER.

Beesia calthifolia Ulbr. [Ranunculaceae].

Known from N. Burma and W. China.

Mishmi, Delei Valley, 6000–7000 ft., July, *Kingdon Ward* 8473, "Flowers white ; amongst undergrowth in the rain-forest."

Ilex Hookeri King [Ilicaceae].

Found in Sikkim.

Mishmi, Delei Valley, 10,000–11,000 ft., June, *Kingdon Ward* 8276, "Evergreen shrub or small tree in Rhododendron thickets. Petals greenish edged with dull-purple."

Ilex intricata Hook. f. var. **oblata** Evans [Ilicaceae].

The species is known from Sikkim and E. Nepal, and the variety from Yunnan.

Mishmi, Delei Valley, 8000–9000 ft., June, *Kingdon Ward* 8167, "A small moss-covered tree in the upper temperate rain-forest."

Ilex odorata Ham. [Ilicaceae].

Previously found in the Himalayas from Sikkim to Nepal.

Mishmi, Delei Valley, 6000 ft., April, *Kingdon Ward* 8092, "A small shrub of the upper rain-forest. Flowers pale chocolate."

Euonymus rongchuensis Marq. & Shaw [Celastraceae].

Reported previously from S.E. Tibet.

Mishmi, Delei Valley, 10,000–11,000 ft., June, *Kingdon Ward* 8312, "A small undershrub in the conifer-Rhododendron forest. Common along the ridge. Flowers bright chocolate-red."

Sabia parviflora Wall. [Sabiaceae].

Known from the Himalayas from Kumaon to Sikkim.

* Continued from *K.B.* 1929, p. 254.

Mishmi, Delei Valley, 2000 ft., March, *Kingdon Ward* 7990, "A small tree with long drooping branches. Flowers greenish."

***Aucuba himalaica* Hook. f.** [Cornaceae].

Known from Sikkim and Bhutan.

Mishmi, Delei Valley, 6000 ft., April, *Kingdon Ward* 8027, "A bushy shrub of the temperate rain-forest."

***Vaccinium Forrestii* Diels** [Vacciniaceae].

Described from Yunnan.

Mishmi, Delei Valley at Chibaon, 6000 ft., April, *Kingdon Ward* 8022, "A bushy shrub on the fringe of the forest along the ridge-crest. Flowers cream-white reddened at the base and with red calyx."

***Gentiana tenella* Fries** [Gentianaceae].

The species is known from Arctic and alpine Europe, North Central Asia and W. Himalayas.

Mishmi, Delei Valley, 11,000-12,000 ft., Oct., *Kingdon Ward* 8716, "Flowers slaty-violet, white in centre. On alpine turf slopes."

***Orthosiphon glandulosus* C. E. C. Fischer** [Labiatae]; *O. Wattii* Prain similis sed omnibus partibus majoribus, foliis late ovatis calycibusque glanduloso-punctatis.

An undershrub; stems obtusely quadrangular, sulcate when dry. *Leaves* cauline, broadly ovate, acuminate, base shortly cuneate or the smaller ones subcordate, 12-23 cm. long, 8-15 cm. wide, with scattered stiff whitish multicellular hairs above, dotted with yellowish glands on both faces, pale beneath, primary nerves 5-7 pairs, ascending, arched, margins broadly apiculate-dentate; petioles 1.5-10 cm. long, glabrous. *Scape* up to 30 cm. long; rhachis obtusely quadrangular, 4-sulcate, more or less densely furfuraceous-brown-hairy; bracts ovate, caudate, nearly glabrous, 7 mm. long; flowers white in whorls of 4 or 6; pedicels brown-furfuraceous, 4-5 mm. long. *Calyx* narrowly campanulate, membranous, 7-9 mm. long, furfuraceous-hairy near the base and on the nerves, dotted outside with glistening yellowish glands; upper lobe orbicular, rounded or very shortly acute, shorter than the tube, its margins shortly decurrent on the tube; lateral and lower lobes narrow and awned, the lower longest; awns minutely hispid. *Corolla* minutely puberulous without; tube 1.6 cm. long, very slender, nearly cylindric; lobes rounded, up to 1.2 cm. long, lower entire, upper 3-fid. *Stamens* inserted near the mouth of the corolla tube; filaments capillary, mauve, up to 7.5 cm. long; anthers very small. *Disk* glabrous, shallowly lobed. *Ovary* glabrous; style filiform, as far exserted as the stamens or slightly further, glabrous; stigma very small, clavate. *Fruiting calyx* declinate, chartaceous, up to 1.6 cm. long; upper lobe strongly convex, nerves prominent. *Nutlets* ellipsoid, slightly compressed, slightly narrowed to the base, 3-4 mm. long, brown; testa raised-reticulate.

Assam in the S. Lushai Hills, 3000 ft., July-August, *W. J. L. Wenger* 272; "undergrowth in bamboo forest."

Asarum cordifolium C. E. C. Fischer [Aristolochiaceae]; *A. caudigero* Hance affine, foliis compluribus cum lobis basalibus imbricatis vel approximatis, floribus majoribus, caudis laborum perianthii multo brevioribus differt.

A stemless herb; rhizome elongate, 3-4 mm. diam. *Leaves* radical, several coetaneous with the flowers, somewhat fleshly, dark olive-green and polished above, paler beneath, broadly ovate- or subrotund-cordate, acute, basal lobes rounded, usually overlapping, sinus narrow, 6-15 cm. long. 4.5-11 cm. wide, minutely pellucid-dotted, palmately 7-ribbed, nerves reticulating to form areolas with included T-shaped free venules, ribs and nerves more or less furnished on both faces with crisped multicellular hairs, margins thickened, minutely undulate and sparsely minutely ciliate; petioles glabrous or sparsely puberulous, 7-30 cm. long. *Flowers* radical, solitary; pedicels up to 2.5 cm. long, rather densely hairy with crisped multicellular dark-brown hairs; bracts 2, lanceolate, ciliate up to 1.5 cm. long. *Perianth* campanulate, sparsely hairy without, glabrous within, tube purple, 1 cm. long, lobes 3, green, triangular-lanceolate, caudate, up to 2.5 cm. long including the 6-7 mm. long filiform puberulous tail. *Stamens* 12, sometimes 1 or 2 filiform rudimentary added, 4-5 mm. long; filaments slightly dilated below; connective shortly produced. *Ovary* filling the perianth-tube, its apex slightly protruded, 6-celled; styles 6, united into a conical column, free near the apex. *Fruit* subglobose, 1.5 cm. long. *Seeds* numerous, narrowly obovate, boat-shaped, the margins incurved, 5 mm. long.

Assam: Delei Valley, 3000-4000 ft., flowers April, *Kingdon Ward* 8123 (type), "Growing on shady earth banks, half buried and completely shaded in the undergrowth." Burma: Mali-Nam Tamai Divide, 3000-4000 ft., fruit April, *Kingdon Ward* 6661, "On shaded earth banks where the soil is moist."

XXVIII.—SCILLA LANCEAEFOLIA OF THE FLORA CAPENSIS. C. A. SMITH.

The following note embodies the results of an investigation into the specific identity of two specimens sent to Kew for naming by the Chief, Division of Plant Industry, Pretoria. Publication of the results seems desirable in view of the fact that specimens referred to *Scilla* "*lanceaeifolia*" have been the subject of important researches;* and, since this species appears to have been erroneously interpreted in current authoritative botanical literature, it seems further desirable to draw the attention of taxonomists to the changes in synonymy and citations which examination of type material, as well as original figures of the species involved, has rendered necessary.

*Trans. Roy. Soc. S. Afr. xii. 1-4 (1924).

The species which forms the subject of this note was described and figured by Jacquin as *Lachenalia lanceaefolia* in his Ic. Pl. Rar. ii. 17, t. 402 (1786-93), from specimens of bulbs cultivated by him and collected by Scholl and Boos, two Viennese gardeners, at the Cape, most probably in the Albany division. The brief specific diagnosis first given by Jacquin was later much amplified by him in his Collect. v. Suppl. 69 (1796).

By about the year 1800 the same species had been introduced into several of the big English gardens, e.g. Kew (Ait. Hort. Kew. Ed. 2, ii. 287), and three years later was figured under the same name by Curtis, Bot. Mag. xvii. t. 643, the figure agreeing in all essential details with that of the nomenclatural type, i.e. in the spotted, long-acuminate, broadly ovate-lanceolate leaves, and in the relative lengths of inflorescence (including the peduncle) and leaves.

Then in 1811, Gawler (Bot. Mag. xxxiv. sub t. 1380) transferred the Jacquinian species to *Drimia* Jacq., along with several others previously referred to *Lachenalia*, thereby preparing the ground for a fair amount of confusion which followed. Baker, who was the first clearly to discriminate between the genera *Scilla*, *Lachenalia*, and *Drimia*, thus refers to this state of affairs (Saund. Ref. Bot. iii. Append. 1-2 : 1870) : " It was, we think, under a complete misapprehension that Gawler put into it [i.e. *Drimia*] his *D. lanceaefolia*, which Jacquin had described under *Lachenalia*, inasmuch as it wants all the distinctive characters upon which *Drimia* as a genus can be upheld. Unfortunately *lanceaefolia*, being a plant which at that time was widely diffused in cultivation, got to represent popularly the idea of *Drimia* ; and Kunth, who saw that it was impossible to characterise genera and keep *lanceaefolia* and the Jacquinian *Drimiae* together, unaccountably [Enum. iv. 338 : 1843] restricted *Drimia* to *lanceaefolia* and the plants which correspond with it in structure, and made for the Jacquinian *Drimiae* a new genus under the name of *Idothea*."

Baker, however, had for some time prior to 1870 been actively engaged on describing plants belonging to these genera (chiefly from Cooper's rich collection from the Cape) for Saunders' Refugium Botanicum, and was able to characterise (loc. supra cit. pp. 2-4) the genera *Scilla* and *Drimia* in such a way as to restore order to the then existing confusion. But, in describing one of Cooper's plants as *Scilla lanceaefolia* (Saund. Ref. Bot. iii. t. 182), Baker erroneously identified this with *Lachenalia lanceaefolia* Jacq., a careful comparison of the description and the excellent plate (t. 182) with that of the Jacquinian plant clearly indicating important differences in leaf and inflorescence characters.

The name *S. lanceifolia* (Jacq.) Baker cannot, therefore, be correctly applied to the plant described by Baker, but should be restricted to the Jacquinian species, while Baker's plant must have a new name. This, with the details of synonymy, is as follows :—

S. guttata C. A. Sm., nom. nov.

S. lanceaefolia Baker in Saund. Ref. Bot. iii. t. 182 (1870), quoad descr. et ic., sed excl. syn.; & in Journ. Linn. Soc. xiii. 251 (1873), excl. syn. et var. *ovatifolia* Baker (loc. cit. 252); & in Dyer, Fl. Cap. vi. 487 (1897), excl. syn.

SOUTH EASTERN REGION. Natal, Durban Div.: near Durban (?), Cooper, dried cultivated specimen! (type, K*). Inanda Div.: Inanda, Wood 181! (BM).

Cooper's original specimen (of the cultivated plant) is represented in the Kew Herbarium by a single raceme and a leaf, the label accompanying it giving no indication of the original place of collection. There is, however, an excellently dried and preserved specimen in Herb. Mus. Brit., collected by Wood at Inanda, Natal, which agrees in all respects with the plate and description of *S. lanceaefolia* Baker. From this fact, the type locality of the species would in all probability be in the Durban area, where Cooper collected in 1862, Inanda being in an adjoining area.

(N.B. The specimens cited under *S. lanceaefolia* Baker in Fl. Trop. Afr. vii. 557, do not belong to this species, but appear instead to belong to several undescribed species).

The detailed synonymy of the real *S. lanceifolia* is as follows:—

S. lanceifolia (Jacq.) Baker in Saund. Ref. Bot. iii. sub t. 182 (1870), quoad syn. Jacq., sed excl. descr. et ic.

Lachenalia lanceaefolia Jacq. Ic. Rar. Pl. ii. 17, t. 402 (1786-93); & Collect. v. Suppl. 69 (1796); Willd. Sp. Pl. ii. 1. 178 (1799); Gawler in Curt. Bot. Mag. xvii. t. 643 (1803); Ait. Hort. Kew. Ed. 2, ii. 287 (1811); Poir. Encycl. Suppl. iii. 231 (1813); Tratt. Aug. Taf. Archiv ii. tt. 125, 126: 1813 (ex Ind. Lond.); Link, Enum. Pl. Hort. Berol. i. 332 (1821).

Drimia lanceaefolia Gawler in Curt. Bot. Mag. xxxiv. sub t. 1380 (1811), incl. var. *major* Gawler (loc. cit.); Schrad. Blumenb. 29 (1827), incl. var. *densiflora* Schrad. (loc. cit.); Spreng. Syst. Veg. ii. 75 (1825); Schult. & Schult. f. Syst. Veg. vii. 594 (1829); Kunth, Enum. Pl. iv. 339 (1843).

Lachenalia lanceaefolia var. *maculata* Tratt. Archiv Gewächsk. ii. 132, t. 168 (1814).

Drimia acuminata Lodd. Bot. Cab. xi. t. 1041 (1825), nomen; Kunth, Enum. iv. 339 (1843), descr.

Sugillaria lanceaefolia† Baker in Journ. Linn. Soc. xiii. 251 (1873), in syn.

*In citing specimens in this article, the following abbreviations have been inserted after the numbers to indicate the Herbarium where the specimen is to be found:—BM, British Museum (Natural History). K, Royal Botanic Gardens, Kew. Pa, National Herbarium, Division of Plant Industry, Pretoria. R, Herbarium of F. A. Rogers.

†In the reference given Baker attributes this combination to Salisbury (Gen. Pl. Fragm. 18: 1866), but the latter never effected this combination. He merely indicated that his genus *Sugillaria* was based on *Lachenalia lanceaefolia* Jacq.

For purposes of easy reference, Jacquin's diagnosis, as emended by him in his Collect. v. Suppl. 69, is here given in full detail :—

“Crescit ad Promontorium bonae Spei, florens apud nos a Junio ad Augustum, tota glabra et inodora. *Bulbus* ovatus, tunicatus, sescunciam diametro aequans, externe fuscus. *Folia* radicalia plura, lanceolato-acuminata, integerrima, plana cum solis apicibus subcanaliculatis, carnosula, firmula, utrinque pallide et sine nitore virentia, supra maculis magnis sordideque atrovirentibus tota picta, inferiora in orbem prostrata, interiora juniora erecta, majora quinque uncias longa et sescunciam lata. *Scapi* axillares, solitarii, foliis longiores, teretes, graciles, inferne obsolete maculati, prostrati, racemosi, multiflori. *Pedicelli* uniflori, semunciales, cum in flore tum in fructu patentissimi, in flore purpurei, dein virides, bracteola suffulti minutissima. *Flores* parvi, petalis utrinque sordide virentibus cum punctis minutis sanguineis; filamentis basi albis, caeterum rubris; antheris flavescentibus; stylo rubro, et superne albo. *Fructus* figura quam maxime dissimilis a germine, saepius sine omni sulco teres. *Semina* paucissima ad maturitatem perveniunt; saepe unicum, totam tunc capsulam implens, veluti unilocularem, propter destructa tunc ab aucto semine dissepimenta. Hinc capsula rarissime talis est, qualem in charcatere generico describam, et qualis ex germinis structura semper esse deberet. Bractea steriles in hac specie, uti et in *Lachenalia patula*, contra morem congenerum nullae racemum terminant.

[Character genericus].

Cal. nullus.

Cor. Petala sex, oblonga, obtusa, apice inflexo et calloso fornicatula, omnia aequali et saimillima, tria exteriora inferne connata cum tribus interioribus, supra concretionem omnia primum patentissima, dein reflexa; tandem iterum erecta et emarcida persistentia in fructu.

Stam. Filamenta sex, ex basi petalorum orta, subulata, erecta, longitudine corollae. Antherae oblongae, erectae.

Pist. Germen superum, pedicellatum, late conicum, obtusissimum, sexsulcatum. Stylus subulatus, sexsulcatus, erectus, longitudine staminum. Stigma obsolete trifidum, muricatum.

Per. Capsula oblonga, obtusissima, triloba, sexsulcata, longitudine corollae, trilocularis, trivalvis.

Sem. in quolibet loculamento gemina, oblonga, teretia.”

So far as available herbarium material goes, the above species seems to be unrepresented, and known only from the illustrations already cited in the above synonymy.

Further investigation into the synonymy of *S. lanceifolia* as given by Baker in the references already cited, brought out the following points :—

(i) The plant described by Gawler as *Drimia lanceaefolia* var. *minor* (Curt. Bot. Mag. xxxiv. t. 1380: 1811) was recognised as a

distinct species by Schrader who named it *D. Gawleri* (Blumenb. 30 : 1827), excluding *Lachenalia reflexa* Andr., which Gawler regarded as synonymous with his variety already noted. Andrew's specific name is invalidated by the prior homonym *L. reflexa* Thunb. (Prodr. i. 64 : 1794), and the species was renamed by Schrader (loc. cit. 38) under *Drimia* as *D. lanceolata*. Baker, however, recognised the species as a *Scilla* (§ *Ledebouria*) and transferred it to this genus as *S. lanceolata* (Schrad.) Baker in Saund. Ref. Bot. iii. Append. 14 (1870), but, in so doing, apparently failed to recognise that this name was invalidated by the much earlier *S. lanceolata* Viviani (Fl. Cors. Prodr. Append. Alt. 3 : 1830), which is a Mediterranean species. The South African species must therefore have another name, for which the following is proposed :—

S. doratophylla C. A. Sm., nom. nov.

Lachenalia reflexa Andr. Bot. Rep. v. t. 299 (1803) ; Tratt. Archiv Gewächsk. ii. 132, t. 169 (1814) ; non Thunb. (1794).

Drimia lanceolata Schrad. Blumenb. 28 (1827) ; Schult. & Schult. f. Syst. Veg. vii. 594 (1829) ; Kunth, Enum. iv. 339 (1843).

Scilla lanceolata Baker in Saund. Ref. Bot. iii. Append. 14 (1870) ; & in Journ. Linn. Soc. xiii. 254 (1873) ; & in Dyer, Fl. Cap. vi. 492 (1897) ; non Viv. (1830).

(ii) The figure of *Drimia lanceaefolia* Lodd. (Bot. Cab. iii. t. 278 : 1818) was not accompanied by any specific diagnosis or citation of authority for the name, and it certainly does not represent the plant which had been so named by Gawler (Bot. Mag. sub. t. 1380). Schrader therefore (Blumenb. 30 : 1827) correctly renamed it *D. ovalifolia*, but if Loddiges' plate is the basis of Schrader's species, then *D. Gawleri* above noted, is conspecific with *D. ovalifolia*, as a comparison of the descriptions and the figures involved readily shows. Both further agree with Baker's diagnosis of a species described by him as *S. revoluta* (Ref. Bot. iii. Append. 6 : 1870), to which he referred them. It should be noted, however, that it is indeed very doubtful whether this species is identical with *Hyacinthus revolutus* Linn. f. (Suppl. 204 : 1781), based on a Thunberg specimen, the descriptions given by Baker of his specimens differing markedly from that given by Thunberg (Fl. Cap. Ed. Schult. 326 : 1823) of the type plant, which Baker had not seen. *S. revoluta* (Linn. f.) Baker being a nomenclatural synonym of *Hyacinthus revolutus* Linn. f., cannot be applied to another species. The choice of an epithet for the species under consideration thus lies between *D. Gawleri* and *D. ovalifolia* Schrad., the specific epithet of one of which has to be taken up under *Scilla*. Hence :—

S. ovalifolia (Schrad.) C. A. Sm., comb. nov.

Hyacinthus revolutus Ait. Hort. Kew. i. 458 (1789) ; & Ed. 2, ii. 283 (1811) ; non Linn. f. (1781).

Drimia lanceaefolia var. *minor* Gawler in Curt. Bot. Mag. xxxiv. t. 1380 (1811), excl. syn. Andrews.

D. lanceaefolia Lodd. Bot. Cab. iii. t. 278 (1818), nomen ; Link, Enum. Pl. Hort. Berol. i. 330 (1821), descr. ; non Gawler (1811).

D. ovalifolia Schrad. Blumenb. 30 (1827) ; Schult. & Schult. f. Syst. Veg. vii. 596 (1829) ; Kunth, Enum. iv. 339 (1843).

D. Gawleri Schrad. loc. cit. 30 ; Schult. & Schult. f. loc. cit. 595 Kunth, loc. cit. 339.

Xeodolon sp. Salisb. Gen. Pl. Fragm. 18 (1866).

Scilla revoluta Baker in Saund. Ref. Bot. iii. Append. 6 (1870) ; & in Journ. Linn. Soc. xiii. 246 (1873) ; & in Dyer, Fl. Cap. vi. 485 (1897), quoad. descr. sed excl. syn. Linn. f., Pers. & Kunth.

Xeodolon revolutum Baker in Journ. Linn. Soc. xiii. 246 (1873) ; & in Dyer, Fl. Cap. vi. 485 (1897), in syn.

(iii) The plant described by Wood (Natal Pl. iii. 4, t. 202 : 1900) as *Scilla lanceaefolia* agrees neither with the figure of the nomenclatural type (Jacq. Ic. Rar. Pl. ii. t. 402 : 1786-93), nor with the plant described by Baker (Saund. Ref. Bot. iii. t. 182 : 1870) under that name (= *S. guttata* C. A. Sm.). It differs from both very markedly in the shape of its leaves, in the relative lengths of leaf and raceme, and in the peculiar truncate apices of the scales of the bulb. Wood does not cite any particular specimen under his description, merely stating that the plant figured was collected round Durban, but there are specimens (in Herb. Kew. & Mus. Brit.) of *Krauss* 464, collected on "grassy places at the foot of Tafelberg (near Pietermaritzburg) and round Natalbaai" (Durban bay), which agree in all essential details (such as those noted above) with Wood's figure and description. The name used by Wood belonging to a different plant, the species described by him must have a new name, and the following is here proposed :—

S. cicatricosa C. A. Sm., nom nov.

S. lanceaefolia Wood, Natal Pl. iii. 4, t. 202 (1900) ; non Baker (1870).

(iv) Trattinick (Archiv. Gewächsk. ii. 132, t. 167 : 1814) erroneously identifies the plant figured by Redouté (Lil. i. t. 59), which he reproduces almost exactly (tab. 167), as the typical *Lachenalia lanceaefolia* Jacq., though he mentions neither the source of his figure nor Jacquin's. He then (p. 132), describes a var. *maculata* of the above species, basing this on Bot. Mag. t. 643, which is again almost exactly reproduced (tab. 168). In describing how the var. *maculata* differs from the species, he states that it differs in : "1. foliis rotundo maculatis, glaucescentibus ; 2. inflorescentia fertiliori ; 3. floribus 3 plo majoribus ; 4. petalis non simul reflexis ; 5. thecaphoro seu germine pedicellato," and concludes with "Si varietas, tamen attentionis dignissima !" The error in the above of course lies in the fact that Bot. Mag. tab. 643, which is typical *L. lanceaefolia* Jacq., is made the type figure of a variety of that species, but the interest of Trattinick's distinctions between the "species" and the "variety" lies in this—he was the only author to call

attention to the very manifest differences existing between Redouté's plant as represented by his exquisite coloured plate and that of the typical form of the species as represented by the Bot. Mag. figure. Trattinick's differential characters above noted are by no means convincing, but when Redouté's plate is compared with the Jacquinian figure, the very striking differences in leaf and especially inflorescence characters in the plants represented are so evident as to warrant specific separation for Redouté's plant.

Careful comparison of type material at Kew of those species which appeared to come nearest to Redouté's plant, showed that the latter agrees exactly in all essential details with the type of *S. livida* Baker; for although Redouté's plate shows the leaves to be remotely spotted, a condition not met with in Baker's species, Redouté thus describes this character (loc. cit. sub t. 59): ". . . . marquées à la surface supérieure de taches vertes ovales ou oblongues; ces taches s'évanouissent dans les feuilles adultes."

The detailed synonymy of *S. livida* Baker may thus be cited as follows:—

***S. livida* Baker** in Gard. Chron. xx. 166 (1883); & in Dyer, Fl. Cap. vi. 490 (1897).

Lachenalia lanceaefolia Red. Lil. i. t. 59 (1802); Tratt. Archiv Gewächsk. ii. 132, t. 167 (1814); non Jacq. (1786-93).

SOUTH AFRICA. Without precise locality, *cult. spec. e Hort. Horsman*! (type, K).

If should further be noted that the plant—"Natal; cultivated specimen, *Hort. Kew*!"—cited by Baker (Fl. Cap. vi. 490) as the above species, certainly does not belong here at all, but appears to represent *S. spathulata* Baker (Saund. Ref. Bot. iii. t. 187). This material is, however, imperfect, consisting only of a single leaf, and the part of one inflorescence, so that either Redouté's description (loc. cit.), or that of the Gard. Chron. (loc. cit.) should be consulted for the specific diagnosis of *S. livida* Baker, that of the Flora Capensis, apart from its brevity, being misleading.

(v) Another plant, *Scilla maculata* Schrank (loc. infra cit.), has often been cited as being conspecific with the older Jacquinian species, *Lachenalia lanceaefolia*, but from the latter, as well as other closely allied species, it is readily distinguished by its unusually long-pedicelled flowers, and its leaf and inflorescence characters. Thus Schrader was led to regard (Blumenb. 30: 1827) Schrank's species as a varietal form (var. *longipedunculata* Schrad.) of *Drimia lanceaefolia* (Jacq.) Gawler, but the characters presented by Schrank's plant, as shown in his fairly good plate, are sufficiently distinctive to warrant its specific separation, and since the work in which Schrader published the species may not be readily accessible to South African taxonomists, the original diagnosis is here reproduced:—

***S. maculata* Schrank**, Pl. Rar. Hort. Acad. Monac. ii. fol. 100, t. 100 (1820).

Drimia lanceaefolia var. *longipedunculata* Schrad. Blumenb. 30 (1827); Kunth, Enum. iv. 339 (1843).

"S. racemo-pyramidalis, multifloro; pedunculis longissimis, patentibus, junioribus coloratis; petalis staminum longitudine, post anthesin reflexis; foliis lanceolatis, superne saturatius maculatis.

BULBUS tunicatus, fere dupla magnitudine Strobili Pini sylvestris.

FOLIA radicalia, lanceolata, amplexicaulia, acuta, patentia, apice sub-reflexa, laete viridia, maculis saturatioribus in pagina superiori (*sic*) picta, longa pollices transversos circiter tres, lata in basi unum.

SCAPI plures, teretes, foliis plus duplo longiores (cum Racemo), apice racemum ferentes.

RACEMUS tres digitos altus, multiflorus, laxus. *Pedunculi* sparsi, longissimi (plusquam pollicares), patentes, in juventute rubenti-violacei, deflorati virides, demum fructiferi erecti. *Flores* minimi, vix trilineares.

PERIGONIUM subcalycinum, hexaphyllum, persistens. *Petala* oblonga, erecta, dorso atropurpureo, margine subalbido, dein medietate superiore patula, patentia pro gradu maturitatis diverso, deflorata reflexa, viridia, dorso sordidata.

STAMINA sex. *Filamenta* filiformia, basi perigonii adnata, ejusque longitudine, purpurei. *Antherae* ovatae, atropurpureae, biloculares. *Pollen* flavum.

PISTILLUM. *Ovarium* brevissime pedicellatum, globoso-hexagonum, viride. *Stylus* subulatus, purpureus, staminibus paulo brevior. *Stigma* simplex.

FRUCTUS. *Capsula* globoso-hexagona.

PATRIA. Promontorium Bonae Spei, unde *D. Prems Bambergensis* bulbos misit, qui altero anno floruerunt."

(vi) Although it has not been found practicable to re-identify all the specimens cited by Baker under *Scilla lanceaefolia* (Fl. Cap. vi. 487-488), as well as those subsequently identified by him and others as this species, the following have thus far been placed specifically :—

Wood 41 (K). *S. ovatifolia* Baker.

Wood 181 (BM). *S. guttata* C. A. Sm.

Krauss 464 (BM, K). *S. cicatricosa* C. A. Sm.

Burke s.n. (K). *S. inquinata* C. A. Sm. (vide infra).

Phillips 3068 (Pa). *S. climacocarpha* C. A. Sm. (vide infra).

Pont 298 (Pa). *S. climacocarpha* C. A. Sm. (vide infra).

Cooper 3286 & 3287 (K). can only be doubtfully referred to *S. polyantha* Baker owing to defective material.

S. (Ledebouria) inquinata C. A. Sm., sp. nov. [Liliaceae-Scilleae]; *S. graminifoliae* Baker affinis, sed foliis latioribus et brevioribus facile distinguenda.

Bulbus ovideus, tunicatus, usque 3.5 cm. diam., apice in collum breve (circiter 1 cm. longum) crassum productus, tunicis exterioribus tenuibus, punctis vel maculis purpureis pulchre notatis vel lineis purpureis interruptis cinctis. *Folia* 6–10, adscendentia, linearia, acuta, basi non manifeste attenuata, usque 1.5 cm. longa et 2 mm. lata, carnosio-herbacea, glabra, viridia, basi et (ut videtur) subtus solum maculata. *Inflorescentiae* 2–3, praecoces, foliis circiter duplo longiores. *Racemi* multiflori, oblongi, usque 2 cm. longi et 1.2 cm. lati. *Scapi* adscendentes vel recurvo-adscendentes, glabri, basi obscure maculati. *Pedicelli* patentes, filiformes, rosei, usque 7 mm. longi. *Tepala* oblonga, obtusa, herbacea, carina brunneo-viridia, marginibus pallidiora; exteriora calloso-cucullata. *Filamenta* superne purpurea. *Stylus* purpureus. *Capsula* globoso-hexagona, angulis obtusa, basi truncata, 6-loba, brevissime stipitata.

TRANSVAAL. Pretoria Div.: near Pretoria, along the Aapies River, 1400 m., Oct., *Burke*! s.n. (type, K), *Zeyher* 1702! (BM); in a vleij, near Pretoria, Oct., *Gilfillan in Herb. Galpin* 6081! (Pa, partim in Herb. Kew.)

S. (Ledebouria) climacocarpha C. A. Sm., sp. nov. [Liliaceae-Scillaeeae]; *S. lanceifolia* Baker affinis, sed foliorum et bulbi characteribus differt.

Bulbus ovideus, tunicatus, usque 6 cm. diam., apice in collum distinctum productus, tunicis exterioribus submembranaceis, apice truncatis, sensim decrescentibus. *Folia* 6–8, patentia, late lanceolato-ovata usque ovato-elliptica, in apicem acutum longe angustata, basi attenuata, usque 16 cm. longa et 4.5 cm. lata, carnosio-herbacea, glabra, saturate viridia, nitidula (ut videtur), immaculata. *Inflorescentiae* 2–3, foliis coaeteneae et subaequantes. *Racemi* cylindrici, circiter 5 cm. longi et 3 cm. lati. *Scapi* adscendentes vel decumbentes, glabri, immaculati. *Pedicelli* patentes, pallide virides, usque 2 cm. longi. *Tepala* oblonga, obtusa, herbacea, purpurea, marginibus pallidiora; exteriora apice calloso-cucullata. *Filamenta* dimidio superiore saturate purpurea. *Stylus* 3-gona, crassiusculus, purpureus, stigmate pubescente. *Capsula* globoso-hexagona, angulis obtusa, basi truncata, breviter stipitata.

ORANGE FREE STATE. Bethlehem Div.: near Bethlehem in a damp shady ravine, 1525 m., Dec., *Phillips* 3068! (type, Pa). Kroonstad Div.: in shade on the Vals River at Kroonstad, 1400 m., Nov., *Pont* 298! (Pa.).

Pont 298 differs from the type only in the longer peduncles (scapes) and in the longer neck to the bulb, the latter being thus very much more deep-seated, but as a note by the collector states "sun plants much shorter in bulb and leaves," there can be very little doubt about referring it to the above species.

(vii) The following new combination must replace *S. lorata* Baker, as will be evident from the synonymy:—

S. apertiflora (Baker) C. A. Sm., comb. nov.

Drimia apertiflora Baker in Saund. Ref. Bot. i. t. 19 (1868).

S. lorata Baker in Saund. Ref. Bot. iii. Append. 14 (1870); & in Journ. Linn. Soc. xiii. 253 (1873); & in Dyer, Fl. Cap. vi. 493 (1897).

Baker appears deliberately to have discarded the earlier specific epithet, for he states (Ref. Bot. iii. Append. 14) "placing this [i.e. the above species of *Drimia*] in *Scilla*, the specific name first given is appropriate no longer."

(viii) Through the courtesy of Mr. F. A. Rogers, the writer was able to examine a series of specimens collected by him in South Africa, more particularly, in the Albany and Knysna Divisions. Among these were two numbers, Rogers 25351 and 28366, which agreed in all essential details with specimens in the Kew Herbarium collected by Ecklon and by Zeyher, which had, moreover, been referred to *Scilla Ludwigii* (Miq.) by Baker himself (Fl. Cap. vi. 488: 1897). Now this species was based on a cultivated specimen, which had originally been described as *Drimia Ludwigii* Miq. (Bull. Sc. Phys. Nat. Néerl. i. 39: 1839), and of which bulbs were doubtless received from the celebrated Baron von Ludwig, then resident at the Cape. In referring the Ecklon and the Zeyher plants to *S. Ludwigii*, however, Baker overlooked two points: (i) In leaf, bulb and inflorescence characters the Ecklon and the Zeyher specimens do not agree with Miquel's description of his *D. Ludwigii*. (ii) These specimens were distributed under the name *Drimia ensifolia* Ecklon, and Drège (Linnaea, xx. 235: 1847) cites Zeyher 4262, one of the numbers in question, under this name, though without a description of the species. Thus, when Baker took up *D. ensifolia* Ecklon as a 'nomen nudum' under *S. Ludwigii* (e.g. Fl. Cap. vi. 488), he overlooked the fact that *D. ensifolia* Ecklon was a valid name, since it had long before been published with a sufficiently full description by Ecklon in his 'Catalogue' of Uitenhage plants, which appeared in the S. Afr. Quart. Journ. i. 358-380 (1830). This was first pointed out by Britten in a short paper, "Overlooked Cape Plants" (Journ. Bot. xvi. 200-201: 1908), where he then transfers Ecklon's species to *Scilla* as *S. ensifolia* (Eckl.) Britten. In the Kew Herbarium there is a specimen of Ecklon (distributed by MacOwan in 1884), which bears Ecklon's original label with the following details in his hand: "No. 10. *Drimia ensifolia* Herb. E. Auf den Sanddünen am Zwartkopsrivier, 1sten. höhe [i.e. 0-500 ft.]. Jan. [18]30," and there can be very little doubt that this particular number represents Ecklon's type number, and it was, moreover, distributed from the South African Museum Herbarium, which contains the bulk of Ecklon's Herbarium. Further the specimen was collected several months prior to the publication of Ecklon's paper (loc. supra cit.), which deals exclusively with those plants collected round Uitenhage during the period July, 1829, to February,

1830, and which appeared in the 4th number of the "Quarterly Journal," i.e. *after* September, 1830.

It should further be noted that Baker's description of *S. Ludwigii* was very largely taken from Zeyher (III) 4262* in the 1870 and 1872 references given below, since Ecklon's specimens were not rendered available until distributed by MacOwan in 1884. Since, according to MacOwan, Zeyher was collecting in the Western Cape during January, 1830, his No. 4262 could not have been collected at the same time as the type, but the two are certainly conspecific. Hence *S. Ludwigii* Baker (not *Drimia Ludwigii* Miq.), becomes synonymous with the earlier *S. ensifolia* (Eckl.) Britten, so that the following synonymy (with citations) must take the place of that given for the species in current literature :

***Scilla ensifolia* (Eckl.) Britten** in Journ. Bot. xlv. 201 (1908).

Drimia ensifolia Ecklon in S. Afr. Quart. Journ. i. 364 (1830) ; Drège in Linnaea, xx. 235 (1847).

Scilla Ludwigii Baker in Saund. Ref. Bot. iii. Append. 9 (1870) ; & in Journ. Linn. Soc. xiii. 248 (1872) ; & in Dyer, Fl. Cap. vi. 488 (1897), quoad. descr. tantum ; non *Drimia Ludwigii* Miq. (1839).

SOUTH WESTERN REGION. Uitenhage Div. : near Uitenhage, on sandy hills on the Zwartkops River, 15-150 m., Jan., Ecklon 10 ! (type, K) ; in a valley and on an adjoining hill on the Zwartkops River, 15-150 m., Zeyher 4262 ! (K).

SOUTH EASTERN REGION. Albany Div. : Manley Flats, 550 m., Dec., Rogers 25351 ! (R), 28366 ! (Pa, R).

It should be noted that Drège 8618a ! from between the Katberg and the Klipplaart River (Cathcart Div., Central Region), cited by Baker (Fl. Cap. vi. 488) under *S. Ludwigii*, should be referred to *S. pusilla* Baker, so that Mr. Rogers' rediscovery of the above species, in a different locality, appears to have been the first record for the species for close upon a century.

Another fortunate discovery (by the same collector) which deserves mention is that of a plant which is an almost exact duplicate of the type specimen of *Scilla Rogersii* Baker, collected about 1879 in the George-Mosselbay area by, and named after, Mr. Rogers' father, who is perhaps better known for his work on the British species of *Rubus*. It is indeed a singularly happy coincidence that the species named after the father, and of which only one specimen was known, should have been rediscovered by the son. The second record—Rogers 26719 ! (R)—comes from the Knysna Div., near Plettenberg's Bay, and therefore in an area adjoining the type locality.

In concluding this note the writer wishes to express his indebtedness to Mr. J. Ramsbottom, O.B.E., Keeper of the Dept. of Botany,

* The (III) here inserted refers Zeyher's number to the third series of sets issued by him for sale.

British Museum (Natural History), for facilities to consult type material, and to Mr. N. E. Brown, A.L.S., for critical advice on the determination of some of the species.

XXIX.—A SUPPLEMENT TO THE GRASSES OF THE FIJI ISLANDS. V. S. SUMMERHAYES & C. E. HUBBARD.

In 1927* we published an account of the grasses recorded at the time from Fiji. Dr. J. D. Tothill, lately Superintendent of Agriculture, Fiji, and Mrs. Tothill, had been studying the flora of the islands for several years previous to this date, and in 1929 very kindly presented their joint collections to Kew. Dr. Tothill had studied in particular the grasses, collecting altogether over 400 numbers of this family. The majority of these were collected during two trips to the smaller islands of the group. During the first, made in June, 1926, the islands of Tomberua (near the S.W. corner of Viti Levu), Moturiki and Leleuvia (both near Ovalau) were visited. In July and August, 1927, however, a much more extended tour was made, in which visits were made to many islands around Viti Levu and also in the Lau Group. The chief islands visited and the dates of the visits are given below, the information having been compiled from Dr. Tothill's labels.

| | | | | | | | |
|---------------|-----|------|------|-----------------|-----|------|----------------|
| Vatu Lele | ... | July | 5th | Mango | ... | July | 26th |
| Kandavu | ... | " | 9th | Thikombia-i-Lau | ... | " | 26th |
| Koro | ... | " | 12th | Nayau | ... | " | 27th |
| Nairai | ... | " | ? | Lakemba | ... | " | 28th & 29th |
| Ngau | ... | " | 17th | Kambara | ... | " | 29th |
| Mbatiki | ... | " | 18th | Fulanga | ... | " | 30th |
| Vanua Mbalavu | ... | " | 21st | Matuku | ... | Aug. | 2nd |
| Naitamba | ... | " | 23rd | Totoya | ... | " | 3rd |
| Kanathea | ... | " | 24th | Moala | ... | " | 4th |

As a result of Dr. Tothill's collecting, and also further collecting by Mr. Greenwood, 3 more genera (*Saccolipsis*, *Pennisetum* and *Dactylis*) and 12 fresh species (one new to science) have been added to the grass flora of the islands. Also our knowledge of the distribution of most of the species already recorded has been considerably augmented, while Dr. Tothill's notes in many instances contain valuable information as to the time of arrival or progress of spread of many of the introduced species. In a few cases the examination of the new material has enabled us to correct our determinations given in 1927. Even now the island of Vanua Levu has been little explored botanically, and further additions to the grasses may be expected when this is carried out.

The additional material received since the previous paper was written is enumerated below, the genera being arranged as in the

* *Kew Bull.* 1927, p. 18.

previous paper, and the new genera inserted according to their position in the arrangement adopted at Kew. Short descriptions of the fresh species are provided for comparison with those given previously. In the enumeration all specimens were collected by Dr. and Mrs. Tothill unless otherwise stated. The dates of collection of the specimens, where not mentioned, may be obtained from the table given above.

1. COIX Linn.

C. Lacryma-Jobi Linn. Sp. Pl. 972 (1753).

Viti Levu : Mountains near Lautoka, 2000 ft., May 1929, *Greenwood* 186z ; Nasalai, planted, July 1926, *Tothill* 418. Vanua Levu : Mathuata Coast, Nanduri, Nov. 1928, no. 428. Vanua Mbalavu : no. 188. Moala : dominating a wet field of about an acre, no. 109.

The last two specimens approach var. *stenocarpa* Stapf in possessing relatively narrower, ellipsoid-ovoid false-fruits, which however differ widely from those of the variety.

3. ISCHAEMUM Linn.

I. aristatum Linn. Sp. Pl. 1049 (1753).

Vanua Levu : Tabacola, forming dense masses of creeping stems and roots in moist places in cane fields, etc., June 1924, *Greenwood* 590z.

I. rugosum Salisb. Ic. Stirp. Rar. i, t. 1.

Differs from *I. aristatum* in having the lower glume closely and prominently transversely ridged in the lower two-thirds where it is hard and yellowish, the upper third being membranous and green.

Vanua Levu : Wainikoro, near sea level, March 1924, *Greenwood* 743.

China, Indo-Malaya ; introduced elsewhere.

I. vitiense Summerhayes.*

Differs from *I. aristatum* in the following :—Culms up to 18 in. high, nodes glabrous. Leaves quite glabrous. Racemes 3–5 in. long. Spikelets $\frac{1}{4}$ – $\frac{1}{3}$ in. long, sessile one slightly longer, hairy, awn of sessile spikelet nearly 1 in. long.

Fulanga : only two clumps seen, *Tothill* 152.

Restricted to Fiji.

4. IMPERATA Cyr.

I. exaltata Brongn. Voy. Coq. Bot. 101. *I. cylindrica* var. *Koenigii* Summerhayes & Hubbard in Kew. Bull. 1927, 26, non Dur. & Schinz.

Tufted *perennial*. Culms $1\frac{1}{2}$ –6 ft. high. Leaf-blades narrow at base, widened above, $\frac{1}{2}$ – $2\frac{1}{2}$ ft. long, $\frac{1}{12}$ – $\frac{3}{4}$ in. wide, the upper very short. Spikelets mostly paired, unequally stalked, on the continuous branches of a silvery, silky, narrowly lanceolate, rather loose panicle, 3–20 in. long by $\frac{3}{4}$ –3 in. wide ; spikelets all alike, falling at

* A formal diagnosis of this species in latin is supplied on p. 264.

maturity, $\frac{1}{8}$ in. long, two-flowered, upper floret alone perfect, awnless, enveloped by long silky hairs from the base ; stamen 1.

Viti Levu : Lautoka, Dec. 1925, *Greenwood* s.n. ; Nandarivatu, Feb. 1927, *Tothill* 61 ; Suva, reclamation, Jan. 1929, no. 54. Kandavu : probably common on dry leeward plains, no. 134. Moturiki : no. 53. Ngau : no. 387. Lakemba : no. 337. Moala : no. 119. Matuku : not uncommon on the drier hillsides, no. 287.

Malaya, Polynesia.

Vern. name : Plume Grass.

5. *MISCANTHUS* Anderss.

M. japonicus *Anderss.* in Oefvers Vet. Akad. Stockh. 1855, 166.

Vatu Lele : not common, *Tothill* 139.

8. *VETIVERIA* Thouars.

V. zizanioides *Nash* in Small, Fl. S.E. U.S. 67.

Viti Levu : Suva, The Point, an escape from cultivation, May 1926, *Tothill* 29. Matuku : Mulimuli, ornamental grass, no. 280.

9. *CHRYSOPOGON* Trin.

C. aciculatus *Trin.* Fund. Agrost. 188.

Viti Levu : Lautoka, Dec. 1925, *Greenwood* 172 ; Suva, on lawn, April 1926, *Tothill* 50. Vatu Lele : one plant only, no. 138. Moturiki : no. 6. Mbatiki : Manuku, a yellow variety, fairly common, no. 218. Ngau : nos. 399, 411. Koro : at lighthouse and about several native towns, nos. 98, 98a. Kanathea : no. 244. Vanua Mbalavu : *R. W. Paine in Herb. Tothill* 170. Mango : no. 271. Lakemba : no. 348. Moala : no. 123. Totoya : no. 195. Matuku : common, but not yet abundant, no. 297.

Vern. name : Stickseed Grass.

10. *POLLINIA* Trin.

P. glabrata *Trin.* in Bull. Acad. St. Pétersb. i (1836) 70.

Mbatiki : *Tothill* 232a. Ngau : nos. 407, 415. Moala : several patches in heavy shade in woods, no. 108.

11. *AMPHILOPHIS* Nash.

A. glabra *Stapf* in Prain, Fl. Trop. Afr. ix. 172.

Viti Levu : Lautoka, Dec. 1925, *Greenwood* 12. Mbatiki : *Tothill* 232. Ngau : no. 409. Nairai : no. 382. Kanathea : no. 249. Nayau : no. 318. Lakemba : no. 335. Totoya : no. 193a. Matuku : an occasional plant seen in suitable situations, no. 285.

The specimens from Nairai and Mbatiki are sterile and their identification is therefore only tentative. Of the latter Dr. Tothill says : " This is the bluish grass that lends colour and character to the Caboni and Nanuku districts of Viti Levu." All the specimens enumerated above belong, so far as can be seen, to the epunctate variety or form of the species.

12. *DICHANTHIUM* Willemet.

D. caricosum *A. Camus* in Lecomte, Fl. Gen. l'Indo-Chine, vii. 318.

Viti Levu : Nasinu Experimental Stn., April 1926, *Tothill* 44.
Vanua Levu : Lambasa, Sept. 1923, *Greenwood* 594a.

D. annulatum *Stapf* in Prain, Fl. Trop. Afr. ix. 178.

Viti Levu : common near Casey's Baths, Suva, April 1926, *Tothill* 3 ; August 1927, no. 242.

13. *CYMBOPOGON* Spreng.

C. refractus *A. Camus* in Rev. Bot. Appl. i. 279 (1921).

Viti Levu : Lautoka, April 1919, *Greenwood* 178z. Nandarivatu, Feb. 1927, *Tothill* 70. Kandavu : abundant on the dry leeward plains west of the Mission, no. 126. Kanathea : no. 251. Lakemba : no. 346. Totoya : no. 193. Matuku : nos. 281, 301.

C. coloratus *Stapf* in Kew Bull. 1906, 356.

Viti Levu : Nasinu Experimental Station, an escape from cultivation, 8 feet high, *Tothill* 42.

14. *HETEROPOGON* Pers.

H. contortus *Beauv. ex Roem. & Schult.* Syst. Veg. ii. 836.

Viti Levu : Latoka, March 1919, *Greenwood* 97z. Matuku : only a single clump seen, *Tothill* 310.

16. *DIGITARIA* Hall.

D. pruriens *Buese* in Miq. Pl. Jungh. 379.

Viti Levu : Lautoka, March 1919, *Greenwood* s.n. ; Nandarivatu, Feb. 1927, *Tothill* 63, 68a ; Suva, on lawn, 1926, no. 36. Kandavu : common by road, in cultivated fields and in shady places between Cape Washington Lighthouse and Mission, nos. 132, 135, s.n. Vatu Lele : very common as a weed of cultivation, nos. 141, 146, 147. Tomberua : no. 21. Moturiki : no. 4. Mbatiki : not uncommon in the few suitable situations, no. 238. Ngau : nos. 392, 394, 404. Nairai : nos. 378, 379. Koro : not very common but generally distributed, nos. 92, 103. Kanathea : nos. 257, 258. Vanua Mbalavu : *R. W. Paine in Herb. Tothill* 172. Mango : no. 268. Nayau : no. 323. Lakemba : nos. 332, 344. Kambara : nos. 353, 360. Fulanga : nos. 158, 160. Moala : nos. 121, 122. Totoya : nos. 191, 198. Matuku : nos. 296, 299.

D. longiflora *Pers.* Syn. i. 85.

Viti Levu : Lautoka, May 1919, *Greenwood* s.n. ; Nandarivatu, Feb. 1927, *Tothill* s.n. ; Suva, the Point, common on coast just above tide level, April 1926, no. 37 ; in a lawn, April, 1926, no. 38. Moturiki : no. 9. Mbatiki : common at Naingani, no. 231. Ngau : nos. 393, 394a, 402. Koro : uncommon, evidently a recent introduction, nos. 92a, 95. Vanua Mbalavu : no. 182. Mango : no. 262. Moala : thoroughly established along the paths, no. 114. Totoya : no. 205. Matuku : common, no. 294.

D. chinensis *Hornem.* Hort. Hafn. Suppl. 8.

Viti Levu : Nandarivatu, Feb. 1927, *Tothill* 68, 77, 99 ; Suva, April 1926, no. 55. Ngau : no. 412.

D. marginata *Link.* Hort. Berol. i. 229, var. *fimbriata* *Stapf* in Prain, Fl. Trop. Afr. ix. 440.

Differing from *D. pruriens* in the following :—*Annual*. Spikelets $\frac{1}{2}$ – $\frac{1}{8}$ in. long, stalked spikelet with spreading hairs on both sides, often mixed with short yellow bristles, forming a prominent fringe.

Viti Levu : between Penang and mountains, creeping on sides of drains and watercourses on open poor hillsides, 200 ft., March 1929, *Greenwood* 753.

Pantropical, but rare in America.

17. ERIOCHLOA H.B. & K.

E. procera *C. E. Hubbard* comb. nov. *E. ramosa* *O. Ktze.* Rev. Gen. Pl. ii, 775 ; Summerhayes and Hubbard in Kew Bull. 1927, 32. *Agrostis procera* *Retz.* Obs. iv. 19 (1786). *Milium ramosum* *Retz.* Obs. vi. 22 (1791).

Viti Levu : Suva, the Point, near seashore, April 1926, *Tothill* 33.

18. BRACHIARIA Griseb.

B. distachya *Stapf* in Prain, Fl. Trop. Afr. ix. 565 (1919), in obs. ; Summerhayes and Hubbard in Kew. Bull. 1927, 32.

Viti Levu : Suva, the Point, just above high tide, April 1926, *Tothill* 31 ; Lautoka, Dec. 1925, *Greenwood* 932. Moturiki : *Tothill* 12a. Mbatiki : fairly common in sandy situations, no. 224. Koro : no. 88. Kanathea : nos. 253, 259. Vanua Mbalavu : *R. W. Paine in Herb. Tothill* 174, *Tothill* 177. Mango : not common, no. 275. Kambara : nos. 167, 361. Fulanga : nos. 162, 165. Matuku : no. 293.

B. mutica *Stapf* in Prain, Fl. Trop. Afr. ix. 526.

Viti Levu : Suva, April 1926, *Tothill* 39. Mbatiki : one small patch near Naingani, no. 219.

Common throughout the river flats on Viti Levu.

20. PASPALUM Linn.

P. conjugatum *Berg.* in Act. Helv. vii. 129, t. 8.

Viti Levu : Lautoka, March 1921, *Greenwood* 1742 ; Nandarivatu, Feb. 1927, *Tothill* 71 ; Suva, April 1926, no. 57. Moturiki : no. 10. Leleuvia : no. 14. Mbatiki : no. 233. Ngau : no. 401. Nairai : no. 381. Koro : fairly common but not yet abundant, no. 91. Naitamba : *Tothill* s.n. Vanua Mbalavu : no. 181. Mango : common, no. 273. Nayau : nos. 324, 325. Lakemba : no. 333. Kambara : no. 359. Moala : no. 111. Totoya : no. 202. Matuku : well established but in most places not common, no. 289.

P. vaginatum *Sw.* Prodr. Veg. Ind. Occ. 21.

Viti Levu : Suva, brackish swamps, covered at high tide, April 1926, *Tothill* 56. Kandavu : not uncommon along banks of

tidal creeks, no. 125. Tomberua : no. 22. Mbatiki : not common, no. 225. Ngau : no. 400. Koro : not uncommon on tidal creeks, no. 83. Kanathea : no. 256. Vanua Mbalavu : no. 187. Thikombia-i-Lau : no. 313. Mango : no. 266. Lakemba : no. 342. Moala : salt marsh grass, no. 115. Totoya : no. 200. Matuku : no. 304.

This is the common grass of the tidal flats just behind the dogra (*Bruguiera*) zone (Tothill).

P. orbiculare Forst. Prodr. 7.

Viti Levu : Suva, April 1926, *Tothill* 59 ; Nandarivatu, Feb. 1927, no. 72. Vanua Levu : Lambasa, July 1923, *Greenwood* s.n. Moturiki : *Tothill* 5. Mbatiki : no. 227. Naitamba : *Tothill* s.n. Vanua Mbalavu : no. 180. Mango : no. 264. Nayau : no. 329. Moala : no. 110. Totoya : no. 197. Matuku : common, no. 279.

var. **cartilagineum** *Summerhayes and Hubbard* comb. nov. *P. cartilagineum* Presl. Rel. Haenk. i. 216.

Differs from the type in the lemma of the lower floret being cartilaginous instead of membranous.

Kandavu : between Cape Washington lighthouse and mission, not common, *Tothill* 127. Ngau : no. 389. Nairai : no. 373.

Distrib. of var. : Indo-Malaya and Polynesia, local.

Vern. name (of both species and variety) : Co-dina.

P. dilatatum Poir. in Lamk. Encycl. Méth. v. 35.

Viti Levu : Suva, Feb. 1927, *Tothill* 58 ; Nandarivatu, naturalised, Feb. 1927, no. 43.

Increasing rapidly in the Colony.

P. Urvillei Steud. Syn. Pl. Glum. i. 24 (1854) ; A. Chase in Contr. U.S. Nat. Herb. xxviii. 173, f. 108 (1929). *P. Larranagai* Arech. in Anal. Mus. Nac. Montevideo, i. 60, pl. 2 (1894). *P. Vaseyanum* Scribn. in U.S. Dept. Agric. Bull. 17. 32, f. 328 (1899).

Differs from *P. dilatatum* in the following respects :—Culms coarser and taller and erect, whereas in *P. dilatatum* they are geniculate at the base. Racemes more numerous, from 10–25 in number. Spikelets $\frac{1}{12}$ in. long.

Viti Levu : Nandarivatu, naturalised, Feb. 1927, *Tothill* 66.

Brazil to Argentina ; introduced into very many parts of the world.

Used mainly as a fodder grass and grown for hay in the United States. It flourishes best on wet, heavy land but can also withstand severe drought.

Vern. Name : “ Vasey Grass.”

21. STENOTAPHRUM Trin.

S. secundatum O. Ktze. Rev. Gen. Pl. ii. 794.

Viti Levu : Suva, Nasesi, just above tide level, April 1926, *Tothill* 49. Kanathea : no. 254.

A cultivated specimen was also collected on Mango. The field at Mango is said to "keep the working bullocks and cows in excellent condition."

S. subulatum *Trin.* in Mém. Acad. St. Pétersb. Sér. vi. Sci. Nat. iii. 190.

Leleuvia : *Tothill* 19. Mbatiki : no. 229. Ngau : on sea-shore, no. 405. Vanua Mbalavu : *R. W. Paine in Herb. Tothill* 171 ; *Tothill* 175a. Thikombia-i-Lau : no. 315. Lakemba : no. 340. Kambara : on or near the beach, no. 364. Fulanga : no. 155. Totoya : no. 194. Matuku : no. 309.

22. UROCHLOA Beauv.

U. reptans *Stapf* in Prain, Fl. Trop. Afr. ix. 601.

Ngau : *Tothill* 391.

U. paspaloides *Presl*, Rel. Haenk. i. 318.

Viti Levu : between Lautoka and Nadi, 100 ft., April 1929, *Greenwood* 593b ; Suva, on lawn, April 1926, *Tothill* 30. Kandavu : very common in western half, no. 133. Vatu Lele : very common, no. 144. Moturiki : no. 12. Leleuvia : no. 20. Mbatiki : common, no. 224a. Ngau : nos. 388, 395. Nairai : no. 377. Koro : very common, nos. 82, 99. Naitamba : no. 211, *R. W. Paine in Herb. Tothill* 213. Kanathea : *Tothill* 246. Vanua Mbalavu : no. 184. Thikombia-i-Lau : no. 314. Mango : not common, no. 277. Nayau : nos. 319, 326. Lakemba : no. 336. Kambara : no. 351. Moala : no. 117. Totoya : no. 204. Matuku : no. 300.

23. ECHINOCHLOA Beauv.

E. colona *Link*, Hort. Berol. ii. 209.

Viti Levu : Lautoka, May 1919, *Greenwood* s.n. ; Nandarivatu, Feb. 1927, *Tothill* 65 ; Suva, April 1926, no. 34. Vatu Lele : common around all three villages, no. 137. Moturiki : no. 7. Mbatiki : not yet common, no. 226. Ngau : no. 406. Koro : not common, only recently introduced, no. 89. Kanathea : no. 260. Vanua Mbalavu : *R. W. Paine in Herb. Tothill* 173. Mango : *Tothill* 274. Nayau : no. 322. Lakemba : no. 334. Kambara : no. 368. Moala : no. 118. Matuku : not common, no. 298.

24. OPLISMENUS Beauv.

O. hirtellus *Beauv.* Agrost. 54, 168.

Viti Levu : Nasinu Experimental Farm, under a tree, April 1926, no. 2a. Vatu Lele : one patch in fairly deep shade, no. 136. Mbatiki : no. 235. Ngau : no. 403. Nairai : no. 380. Koro : no. 101. Kanathea : no. 261. Vanua Mbalavu : no. 185. Mango : common in the few woodland situations remaining, no. 276. Kambara : nos. 352, 354. Fulanga : no. 164. Moala : no. 106. Totoya : nos. 192, 196. Matuku : no. 305.

O. compositus Beauv. Agrost. 54.

Viti Levu : Lautoka, April 1919, *Greenwood* 222z ; Nandarivatu, Feb. 1927, *Tothill* 62. Kandavu : common in shady places by path between C. Washington lighthouse and mission, no. 131. Vatu Lele : one of the commonest grasses in the woods, no. 143. Moturiki : no. 11. Mbatiki : not uncommon in the few shady woodland areas, no. 239. Ngau : no. 414. Nayau : no. 328. Lakemba : no. 338. Moala : no. 113.

O. imbecillis Roem. & Schult. Syst. Veg. ii. 487.

Viti Levu : Nasinu Experimental Farm, under a tree, April 1926, no. 2.

25. **PANICUM** Linn.

P. maximum Jacq. Ic. i. 2, t. 13.

Viti Levu : April 1919, *Greenwood* s.n. ; Suva, April 1926, *Tothill* 35.

P. decompositum R. Br. Prodr. 191.

Kanatheia : on rock cliffs close to sea-shore, with reed, *Tothill* 243.

26. **CYRTOCOCCUM** Stapf.

C. oxyphyllum Stapf in Hook. Ic. Pl. t. 3096.

Kandavu : in shady places between C. Washington lighthouse and mission, uncommon, *Tothill* 130. Moturiki : no. 13. Mbatiki : no. 234. Ngau : no. 408. Koro : uncommon, in shady places in the woods, no. 87. Naitamba : *Tothill* s.n. Vanua Mbalavu : no. 182a. Mango : no. 272. Moala : no. 107. Totoya : no. 199. Matuku : no. 286.

26a. **SACCOLEPIS** Nash.

S. indica A. Chase in Proc. Biol. Soc. Washington, xxi. 8. *Panicum indicum* Linn. Mant. ii. 184.

Annual. Culms slender, simple or branched, $\frac{1}{2}$ -2 $\frac{1}{2}$ ft. high. Leaf-blades narrow, 1-6 in. long, $\frac{1}{12}$ - $\frac{1}{8}$ in. wide, usually glabrous, flat. Spikelets alike, awnless, falling entire from their very short stalks, on the axis of a cylindrical dense spike-like panicle up to 3 in. long by $\frac{1}{4}$ in. wide. Spikelets obliquely ovate, $\frac{1}{16}$ - $\frac{1}{8}$ in. long, strongly nerved, minutely hairy, 2-flowered with the upper floret alone perfect.

Viti Levu : Nasinu, common, April 1926, *Tothill* 1 ; Aug. 1927, no. 241. Also common at Quaraniqo on the Central Road, Suva.

27. **SETARIA** Beauv.

S. pallidifusca Stapf & Hubbard comb. nov. *S. glauca* Auct. ; Summerhayes and Hubbard in Kew. Bull. 1927, 38 ; non Beauv. *Panicum pallide-fuscum* Schumacher, Beskr. Guin. Pl. 58.

Tufted *annual*. Culms slender, usually geniculate at the base, up to 2 $\frac{1}{2}$ ft. high. Leaf-blades narrow, 2-12 in. long, $\frac{1}{12}$ - $\frac{1}{4}$ in. wide, glabrous except for a few long hairs near the base. Spikelets alike, awnless, each supported by about 8 persistent bristles, falling entire

from their very short stalks, on the axis of a dense cylindrical golden-brown spike up to 3 in. long, by $\frac{1}{4}$ – $\frac{1}{2}$ in. wide ; bristles $\frac{1}{4}$ – $\frac{1}{3}$ in. long. *Spikelets* $\frac{1}{12}$ – $\frac{1}{10}$ in. long, 2-flowered, upper floret alone perfect.

Viti Levu : Lautoka, April 1925, *Greenwood*, s.n. ; Nandarivatu, Feb. 1927, *Tothill* 67 ; Suva, April 1926, no. 48. Mbatiki : not yet common, no. 221. Koro : no. 104. Matuku : only near the Buli's town of Murimuri, no. 308. Common throughout Fiji (*Tothill*).

Tropical and South Africa, Indo-Malaya, Queensland and Polynesia.

Vern. name : Cat-tail Grass.

S. barbata *Kunth*, Rev. Gram. i. 47.

Annual. Culms slender, more or less branched, 1–6 ft. high, usually glabrous. *Leaf-sheaths* with hairy margins and usually hairy otherwise ; blades narrowly lanceolate, 3–12 in. long by $\frac{1}{3}$ – $1\frac{1}{2}$ in. wide, closely pleated and crinkled when young, with rather long fine scattered hairs. *Spikelets* alike, awnless, each usually supported by a single bristle, very shortly stalked, on the branches of a narrow greenish rather loose and often irregularly interrupted panicle up to 9 in. long by $1\frac{1}{2}$ in. wide ; bristles up to over $\frac{1}{2}$ in. long. *Spikelets* oblong or ovate, $\frac{1}{10}$ – $\frac{1}{8}$ in. long, 2-flowered, upper floret alone perfect.

Koro : common on the east side between Matana and the light-house, *Tothill* 81, 86. Not seen elsewhere in Fiji.

A native of West Africa ; introduced into Tropical America, Mascarene Islands and Tropical Asia.

28. RHYNCHELYTRUM Nees.

R. roseum *Stapf and Hubbard ex Bews*, The World's Grasses, 223. *R. Dregeanum* Nees in Lindl. Introd. Nat. Syst. ed. ii. 447 ; Summerhayes and Hubbard in Kew. Bull. 1927, 38. *Tricholaena rosea* Nees, Cat. Sem. Hort. Vratisl. 1835 and in Linnaea, xi. Lit. Ber. 129.

Viti Levu : Lautoka, Dec. 1925, *Greenwood* s.n. ; Suva, April 1926, *Tothill* 46. Naitamba : *Tothill* s.n.

Also common in the Bua province of Vanua Levu (*Tothill*).

28a. PENNISETUM Rich.

P. polystachyon *Schult.* in Roem. and Schult. Syst. Veg. ii. Mant. 146.

A tufted annual or perennial. Culms slender to stout, $\frac{3}{4}$ – $4\frac{1}{2}$ ft. high, simple or branched. *Leaf-blades* narrow, 2–16 in. long, $\frac{1}{5}$ – $\frac{3}{8}$ in. wide, glabrous or hairy. *Spikelets* alike, awnless, surrounded by numerous bristles and falling with them, from the axis of a dense yellowish or purple spike 2–10 in. long by $\frac{2}{3}$ – $1\frac{1}{2}$ in. wide ; bristles densely hairy at the base, unequal, one longer than the rest, $\frac{2}{3}$ –1 in. long. *Spikelets* about $\frac{1}{6}$ in. long, 2-flowered, the upper floret alone perfect.

Viti Levu : Nasinu Experimental Station, wild in places, April 1926, *Tothill* 40.

A native of Tropical Africa and India.

A useful fodder grass, readily established from seed.
Vern. Name : Mission Grass.

P. macrostachyum (Brongn.) Trin. in Mém. Acad. St. Pétersb. Sér. vi. Sc. Nat. iii. II. 177.

Differing from *P. polystachyon* in the following :—A tall graceful perennial up to 8 ft. high. Culms stouter. Leaf-blades $\frac{3}{4}$ –1 $\frac{1}{2}$ in. wide, rounded at the base, glabrous. Spikes up to 14 in. long and 1–2 $\frac{1}{2}$ in. wide; bristles glabrous, longer ones of equal length, $\frac{3}{4}$ –1 $\frac{3}{4}$ in. long.

Viti Levu : Tanavua, near Suva, semi-naturalised in a garden, *Tothill* 417.

Malaya, Philippines, New Guinea, Solomon Islands.

29. CENCHRUS Linn.

C. calyculatus Cav. Ic. v. 39, t. 463.

Kandavu : only one patch seen between Cape Washington light-house and mission, *Tothill* 128. Vatu Lele : occasional, no. 150. Mbatiki : only one plant seen during tour of island, no. 236. Koro : only two specimens seen on E. side between Matana and lighthouse, no. 85. Lakemba : no. 345. Kambara : no. 366. Totoya : no. 189. Matuku : not uncommon, no. 307.

C. echinatus Linn. Sp/ Pl. 1050.

Viti Levu : Lautoka, Dec. 1925, *Greenwood* s.n. ; Suva, April 1926, *Tothill* 52. Vatu Lele : only an occasional patch near the three villages, no. 142. Mbatiki : abundant, no. 237. Ngau : no. 396. Vanua Mbalavu : no. 183. Mango : no. 269. Kambara : no. 367. Fulanga : near the Buli's town, nos. 159, 159a. Totoya : no. 208. Matuku : no. 282.

30. THUAREA Pers.

T. involuta Kunth, Enum. i. 174.

Viti Levu : Suva, the Point, abundant, April 1926, *Tothill* 51. Vatu Lele : common, no. 140. Leleuvia : no. 18. Mbatiki : common, no. 228. Ngau : nos. 384, 386. Nairai : no. 380a. Koro : abundant, no. 93. Wailangi Lala : very abundant all over the island, no. 176. Kanathea : no. 255. Thikombia-i-Lau : no. 311. Mango : no. 263. Nayau : no. 321. Lakemba : no. 341. Kambara : no. 356. Fulanga : no. 153. Totoya : no. 200a. Matuku : common, no. 302.

Only recorded from or very near the sea-shore.

31. ISACHNE R. Br.

I. vitiensis Rendle in Journ. Linn. Soc. Bot. xxxix. 181.

Viti Levu : Nandarivatu, Feb. 1927, *Tothill* 64.

35. SPOROBOLUS R. Br.

S. indicus R. Br. Prodr. 170.

Viti Levu : Drasa, near Lautoka, April 1925, *Greenwood* 560 b ; Suva, common on roadsides, April 1926, *Tothill* 26.

S. diander Beauv. Agrost. 26.

Viti Levu : Suva, April 1925, *Greenwood*, s.n. ; common on roadsides, April 1926, *Tothill* 28. Ngau : no. 398. Koro : no. 102. Vanua Mbalavu : no. 179. Mango : no. 270. Matuku : found only near the Buli's town of Murimuri, no. 283.

S. elongatus R. Br. Prodr. 170.

Differs from *S. indicus* in the long narrow more or less interrupted dense panicle with short branches, and in the acute unequal glumes, the longer one half the length of the spikelet.

Viti Levu : Rarawai, road from Nursery to Dumtas, June 1926, *Greenwood* 744 ; Suva, common on the Race Track, May 1926, *Tothill* 27. Lakemba : no. 339. Matuku : found only near the Buli's town of Murimuri, no. 284.

Indo-Malaya, Australia, Polynesia.

S. virginicus Kunth. Rev. Gram. i. 67.

Perennial. Culms erect or ascending from a long creeping rhizome, branched, up to 18 in. high, covered by the closely overlapping leaf sheaths. *Leaf-sheaths* bearded at the mouth ; blades narrow, rigid, inrolled, up to 6 in. long by $\frac{1}{8}$ in. wide, usually glabrous. *Panicle* much shorter and denser than in *S. indicus*, almost spikelike, $\frac{1}{2}$ -4 in. long, $\frac{1}{4}$ - $\frac{1}{3}$ in. wide. *Spikelets* as in *S. indicus*, $\frac{1}{12}$ - $\frac{1}{8}$ in. long ; lower glume $\frac{1}{2}$ - $\frac{4}{5}$ the length of the lemma.

Kambara : on or near the beach, *Tothill* 365. Fulanga : no. 154.

In most tropical, subtropical and warm temperate countries. A strand plant.

36. ERAGROSTIS Beauv.

E. tenella Roem. & Schult. Syst. ii. 576. *E. plumosa* Link, Enum. Hort. Berol. i. 192 ; Summerhayes and Hubbard in Kew Bull. 1927, 42.

Viti Levu : Suva, April 1926, *Tothill* 47. Vatu Lele : common on the sandy path between the villages on the east side, no. 149. Tomberua : no. 24. Mbatiki : well established in suitable places along paths and around villages, no. 223. Ngau : nos. 390, 410. Nairai : nos. 374, 375. Koro : fairly common around villages and along paths on east side of the island, no. 97. Naitamba : no. 210. Kanathea : no. 248. Vanua Mbalavu : no. 186. Lakemba : no. 348. Kambara : no. 358. Fulanga : no. 161. Totoya : no. 207. Matuku : uncommon, no. 306.

E. elongata Jacq. Eclog. Gram. 3, t. 3.

Differs from *E. pilosa* in the following :—A tufted *perennial*. Culms 4 in.-2 ft. high, slender. Mouth of *leaf-sheath* densely bearded. *Panicle* erect, rigid, open with short spreading branches or narrow and almost spike-like, 2-8 in. long. *Spikelets* almost sessile, 8-30 flowered, $\frac{1}{6}$ - $\frac{2}{3}$ in. long, $\frac{1}{12}$ in. wide ; lemmas $\frac{1}{12}$ in. long ; palea with hairy keels.

Nairai : *Tothill* 376. Koro : no. 80. Lakemba : no. 350. Kambara : not common, along sandy track on a coconut flat, no. 369. Fulanga : no. 156.

India, Malaya, Australia, Polynesia.

Considered an excellent feed for stock in Australia ; also suitable for making hay. All the specimens cited above agree very closely and are characterised by possessing a short very narrow panicle and greenish spikelets ; they might be held to constitute a definite variety of *E. elongata*.

37. CYNODON Pers.

C. Dactylon Pers. Syn. i. 85.

Viti Levu : Dec. 1925, *Greenwood* s.n. ; Nandarivatu, Feb. 1927, *Tothill* 74 ; Suva, from lawn, April 1926, no. 32. Vatu Lele : no. 151. Tomberua : no. 22a. Mbatiki : common, no. 222. Ngau : no. 385. Nairai : 372. Koro : abundant at towns and at lighthouse clearing, no. 94. Naitamba : *R. W. Paine in Herb. Tothill* 212. Kanathea : *Tothill* 247, 252. Thikombia-i-Lau : no. 316. Mango : abundant, no. 267. Nayau : no. 317. Lakemba : no. 331. Kambara : no. 362. Moala : no. 112. Totoya : no. 206. Matuku : no. 288.

Vern. name : " Australian Couch."

38. CHLORIS Swartz.

C. cynodontoides Bal. in Bull. Soc. Bot. Fr. xix. 318.

Viti Levu : Suva, near Casey's Baths, April 1926, *Tothill* 43. Moala : now well established, no. 120. Totoya : no. 201. Matuku : extremely abundant, no. 291.

39. ELEUSINE Gaertn.

E. indica Gaertn. Fruct. i. 8.

Viti Levu : Nandarivatu, Feb. 1927, *Tothill* 176 ; Suva, April 1926, no. 45. Vatu Lele : not common, but occasional about villages, no. 148. Tomberua : no. 23. Moturiki : no. 8. Leleuvia : no. 17. Mbatiki : fairly common, no. 220. Ngau : no. 383. Nairai : no. 371. Koro : no. 100. Kanathea : no. 245. Vanua Mbalavu : no. 169. Thikombia-i-Lau : no. 312. Nayau : no. 327. Lakemba : no. 347. Kambara : no. 357. Fulanga : no. 163. Moala : no. 116. Totoya : no. 203. Matuku : not common, no. 295.

40. CENTOTHECA Desv.

C. latifolia Trin. Fund. Agrost. 141.

Viti Levu : Mt. Evans, May 1919, *Greenwood* 42 ; Nandarivatu, Feb. 1927, *Tothill* 69 ; Suva, Nasinu, in fairly heavy shade, April 1926, no. 41. Leleuvia : no. 16. Mbatiki : not uncommon in shady places, no. 240. Ngau : nos. 397, 413, 416. Nairai : no. 370. Koro : common in shady places, nos. 84, 90. Vanua Mbalavu : nos. 166, 178. Nayau : no. 330. Lakemba : no. 343. Moala : no. 124. Totoya : no. 190. Matuku : no. 290.

Occurs in the bush throughout Viti Levu, from sea-level to 3000 ft. (Tothill).

40a. *DACTYLIS* Linn.

D. glomerata Linn. Sp. Pl. 71 (1753).

Tufted *perennial*. Culms moderately stout, erect or ascending, 6 in. to 3 ft. 6 in. high. Leaves mostly crowded at the base, glabrous; lower sheaths compressed and keeled; blades narrow, 4-12 in. long, $\frac{1}{12}$ - $\frac{1}{3}$ in. wide, flat, rough. Spikelets alike, breaking up at maturity leaving the glumes, very shortly stalked, in dense clusters, forming a lobed, one-sided, more or less contracted panicle up to 6 in. long. Spikelets oblong, $\frac{1}{5}$ - $\frac{1}{3}$ in. long, 3-7-flowered, greenish; lemmas awnless or shortly awned.

Viti Levu: Nandarivatu, naturalised, Jan. 1927, Tothill 60.

A native of the temperate regions of the Old World; introduced elsewhere.

Vern. names: "Cocksfoot," "Orchard Grass" (America).

41. *LEPTURUS* R. Br.

L. repens R. Br. Prodr. 207.

Viti Levu: Singatoka, beach, May 1921, Greenwood 224b. Vatu Lele: common just above high tide level, July 1927, Tothill 145. Tomberua: as in Vatu Lele, no. 25. Mbatiki: common on sandy beaches, no. 230. Koro: common along beach, no. 96. Kanathea: no. 250. Vanua Mbalavu: nos. 175, 175b. Mango: at mouths of creeks and along sea-shore, no. 265. Nayau: no. 320. Kambara: on or near the beach, no. 363. Fulanga: no. 157. Totoya: no. 209. Matuku: common, no. 303.

Schizostachyum glaucifolium Munro in Trans. Linn. Soc. xxvi. 137. (See K.B. 1927, p. 44).

Vanua Levu: Ndreketi, dwarf bamboo, Nov. 1928, Commander Burroughs in Herb. Tothill.

Description of New Species.

Ischaemum vitiense Summerhayes; affine *I. longiseto* Merrill a quo articulis racemorum crassioribus obtusangulis, spicula pedicellata basi fere glabra, glumis inferioribus apice breviter subacute bilobis, ima spiculae sessilis dimidio inferiore longe pilosa, superioribus acuminatis nec aristulatis differt.

Perennis. Culmi robusti, erecti, usque ad 45 cm. alti; innovationes intravaginales. Foliorum vaginae inferne laxae, superne angustiores involutae, glaberrimae, usque ad 17 cm. longae; ligulae lanceolato-triangulares vel anguste ovatae, 3-7 mm. longae; laminae lineari-lanceolatae, acutissimae vel acuminatae, usque ad 30 cm. longae, 6-14 mm. latae, glabrae, omnino laeves, marginibus solum revolutis. Racemi bini, 8-13 cm. longi, circiter 5 mm. lati, fragiles; articuli spiculi vix dimidio breviores, 4 mm. longi, crassi, obtuse trigoni, intus leviter excavati tantum, angulis omnibus longiuscule albido-pilosis; pedicelli articulis breviores, basi et angulo exteriori

longe albido-pilosi, angulis interioribus glabris. *Spiculae sessiles* subfalcatis lanceolatae, 8-9 mm. longae, callo 1.5 mm. longo basi pilis albidis ipso duplo longioribus barbato, brunneae; gluma inferior 2 mm. lata, apice acute breviter bidentata, dorso longe pilosa, carinis latiuscule alata, alis ciliolatis breviter pubescentibus; gluma superior late lanceolata, valde concava, carinata, apice acuta, bidentulata, 7 mm. longa; anthoecium inferius ♂, lemmate lanceolato leviter obliquo 6 mm. longo membranaceo dorso pubescente, palea membranacea acuta carinis pubescentibus; anthoecium superius ♀, lemmate 5 mm. longo usque ad medium acute bifido firme membranaceo, arista leviter geniculata 2.2 cm. longa scaberula columna 8 mm. longa, palea oblongo-lanceolata 5 mm. longa subacuta. *Spiculae pedicellatae* oblique sed non falcatis lanceolatae, 7 mm. longae, brunneae; gluma inferior 2.7 mm. lata, apice inaequaliter acute bidentata, dorso basi longe pilosa, chartacea, carinis valde inaequaliter akata, alis ciliolatis; gluma superior lanceolata, acuta, 6.5 mm. longa, dorso pubescens; anthoecium inferius ut in spiculis sessilibus; anthoecium superius ♀, lemmate 4.5 mm. longo oblongo apice brevissime obtuseque bilobulato membranaceo, arista stricta 9 mm. longa scaberula, palea lemmati aequilonga.

Fiji Islands: Fulanga, only two clumps seen, July 30th 1927, J. D. Tothill 152.

XXX.—ADDITIONS TO THE INDEX KEWENSIS: XI.*

Kurz, Preliminary Report on the Forest and other Vegetation of Pegu, Appendices A, B, D.

Attention has been drawn by Professor W. G. Craib (in litt.) to the fact that numerous names of Burmese trees and shrubs proposed by Sulpice Kurz, the author of the "Forest Flora of British Burma," first appeared in his "Preliminary Report on the Forest and other Vegetation of Pegu" (1875). Their publication in this "Report," however, was for the most part overlooked at the time of preparation of the "Index Kewensis," and many of these names were consequently cited from later publications, thirteen of them being omitted.

For the convenience of botanists, especially those engaged in the study of the Burmese flora, a list of the names concerned is now supplied. New combinations (or names) are followed by the names on which they were based, while new species are accompanied by an indication of their geographical distribution. Names omitted from the Index Kewensis are denoted by an asterisk. M.I.S.

Agrostistachys longifolia, App. A. p. cxi. & App. B. 79: *A. indica* var. *longifolia* Muell. Arg.

**Albizzia angulata*, App. B. 47.—Burma.

heterophylla, App. A. p. lvi.: *Mimosa heterophylla* Roxb.

jiringa, App. A. p. lvi. & App. B. 47: *Mimosa jiringa*.

*Continued from *Kew Bull.* 1930, p. 41.

- Artocarpus calophylla*, App. A. p. cxxiv. & App. B. 82.—Burma.
Barringtonia asiatica, App. A. p. lxv. & App. B. 52 : *Mammea asiatica*.
macrostachya, App. A. p. lxvi. & App. B. 52 : *Careya macrostachya*.
Beilschmiedia globularia, App. A. p. c. & App. B. 73.—Burma.
Carumbium, App. A. p. cxiv. & App. B. 81 (*Euphorbiaceae*).
baccatum, App. A. p. cxiv. & App. B. 81 : *Excoecaria baccata*.
insigne, App. A. p. cxiv. & App. B. 81 : *Excoecaria insignis*.
sebiferum, App. A. p. cxiv. & App. B. 81 : *Excoecaria sebifera*.
Castanea lanceaefolia, App. A. p. cxxvii. & App. B. 88 : *Quercus lanceaefolia*.
rhamnifolia, App. A. p. cxxvii. & App. B. 88 : *Castanopsis rhamnifolia*.
Cephalostachyum Griffithii, App. A. p. cxxxviii. & App. B. 94 : *Teinostachyum Griffithii*.
schizostachyoides, App. A. p. cxxxvii. & App. B. 94.—Burma.
virgatum, App. A. p. cxxxvii. & App. B. 94 : *Melocanna virgata*.
Cicca Emblica, App. A. p. cvi. & App. B. 77 : *Phyllanthus Emblica*.
reticulata, App. B. 77.—Burma.
Cleistanthus myrianthus, App. A. p. cx. & App. B. 79 : *Nanopetalum myrianthum*.
**Cordia brunnea*, App. A. p. xcii. & App. B. 68.—Burma.
fragrantissima, App. A. p. xcii. & App. B. 68.—Burma.
Dendrocalamus Brandisii, App. B. 94 : *Bambusa Brandisii*.
calostachyus, App. B. 94 : *Bambusa calostachya*.
criticus, App. B. 94 : *Bambusa critica*.
Griffithianus, App. B. 94 : *Bambusa Griffithiana*.
longispathus, App. B. 94 : *Bambusa longispatha*.
Ellipanthus Helferi, App. B. 43.—Burma.
Endiandra Candolleana, App. A. p. ci. & App. B. 73 : *Dictyodaphne Candolleana*.
Eriobotrya bengalensis, App. A. p. lvii. : *Mespilus bengalensis*.
**Notoniana*, App. A. p. lvii. & App. B. 48 : *Photinia Notoniana Wight & Arn.*
**tinctoria*, App. B. 48.—Burma.
Eugenia acuminatissima, App. A. p. lxiii. & App. B. 51 : *Myrtus acuminatissima*.
Ficus macropoda, App. A. p. cxxiii. & App. B. 86.—Burma.
Galearia Wallichii, App. A. p. cxiii. & App. B. 80 : *Bennettia Wallichii*.
Garcinia Roxburghii, App. A. p. xiii. & App. B. 27 : *Xanthochymus pictorius*.
Gigantochloa albo-ciliata, App. A. p. cxxxvi. & App. B. 93 : *Oxytenanthera albo-ciliata*.
andamanica, App. A. p. cxxxvii. & App. B. 93 : *Bambusa andamanica*.
auriculata, App. A. p. cxxxvii. & App. B. 94 : *Bambusa auriculata*.
Gironniera cuspidata, App. B. 87.—Burma.
lucida, App. A. p. cxvi.—Burma.
Glochidion Daltoni, App. A. p. cv. & App. B. 77 : *Phyllanthus Daltonis*.
nepalense, App. B. 77.—Burma.
sphaerogynum, App. A. p. cv. & App. B. 77 : *Phyllanthus sphaerogynus*.
Gluta elegans, App. A. p. xli. & App. B. 41 : *Syndesmis elegans*.
Hypobathrum racemosum, App. B. 59.—Burma.
strictum, App. B. 59.—Burma.
Isonandra caloneura, App. A. p. lxxxiii. & App. B. 63.—Burma.
polyantha, App. A. p. lxxxiii. & App. B. 63.—Burma.
Ixora naucleiflora, App. B. 57.—Burma.
Lindera assamica, App. A. p. ciii. & App. B. 74 : *Asperula assamica*.
Neesiana, App. A. p. ciii. & App. B. 74 : *Asperula Neesiana*.
nervosa, App. A. p. ciii. & App. B. 74 : *Tetranthera chartacea* var. *nervosa Meissn.*

- Litsea angustifolia*, App. A. p. cii. & App. B. 74 : *Actinodaphne angustifolia* Nees.
concolor, App. A. p. cii. & App. B. 74 : *Actinodaphne concolor* Nees.
Machilus indica, App. A. p. c. & App. B. 73 : *M. odoratissima*.
Mayodendron, App. A. p. xciv. ; App. B. 69 ; App. D. tt. 1, 2 (*Bignoniaceae*).
igneum, App. A. p. xciv. ; App. B. 69 ; App. D. tt. 1, 2 : *Spathodea ignea*.
 **Melocanna baccifera*, App. B. 94.—Burma.
Melochia indica, App. A. p. xxiii. & App. B. 32 : *Visenia indica*.
Memecylon celastrinum, App. A. p. lxvii. & App. B. 53.—Burma.
plebejum, App. A. p. lxvii. & App. B. 53.—Burma.
Mimusops parvifolia, App. A. p. lxxxiv.—Burma.
Olea terniflora, App. A. p. lxxxviii. & App. B. 66 : *Linociera terniflora*.
Oreocnida acuminata, App. A. p. cxvii. & App. B. 82 : *Urtica acuminata*.
Payena Griffithii, App. B. 63.—Burma.
 **Platea crassipes*, App. A. p. xxxiv. : *Stemonurus crassipes*.
 **Polyalthia membranacea*, App. B. 24.—Burma.
Pongamia mitis, App. A. p. xlix. & App. B. 45 : *Robinia mitis* Linn.
 **Ratonia adenophylla*, App. A. p. xxxviii. & App. B. 40 : *Sapindus adenophylla*.
 **Sapindus verticillatus*, App. A. p. xxxviii. & App. B. 40 : *Scytalia verticillata*.
Sarcocephalus cadamba, App. A. p. lxxviii. & App. B. 60 : *Anthocephalus cadamba*.
Shorea nervosa, App. A. p. xviii.—Burma.
 **Stephegyne rotundifolia*, App. B. 60.—Burma.
 **Stereospermum crenulatum*, App. B. 69.—Burma.
Streblus microphylla, App. A. p. cxviii. & App. B. 86.—Burma.
taxoides, App. A. p. cxviii. & App. B. 86 : *Trophis taxoides*.
zeylanica, App. A. p. cxviii. & App. B. 86 : *Epicarpurus zeylanica*.
Terminalia pyrifolia, App. A. p. lix. & App. B. 49 : *Pentaptera pyrifolia* Presl.
 **Tristania acuminata*, App. B. 50.—Burma.
 **Walsura quinquejuga*, App. A. p. xxxiii. & App. B. 37 : *Heynea quinquejuga* Roxb.

XXXI.—ON THE GENERA MORICANDIA AND ORYCHOPHRAGMUS. H. K. AIRY-SHAW.

Attention has recently been drawn to the Chinese Crucifer often known as *Moricandia sonchifolia*, by an illustrated note in The Gardeners' Chronicle for April 5th of this year. Under current classification, and by the rules of priority, this name must be replaced by *Orychophragmus violaceus*.

A. P. de Candolle founded the genus *Moricandia* in his *Systema Naturale* ii. 626 (1821), with three species: (1) *M. arvensis* (the standard species of the genus), based upon the *Brassica arvensis* of Linné; (2) *M. hesperidiflora*, based upon Forskål's *Hesperis acris*, —*Diploaxis acris* (Forsk.) Boissier; (3) *M. teretifolia*, based upon Desfontaine's *Brassica teretifolia*, *Pseuderucaria teretifolia* (Desf.) O. E. Schulz.

At the present day six species are recognised in addition to the original *M. arvensis* (L.) DC., all of them natives of the Mediterranean region (one species, *M. sinaica* Boiss., extending eastwards as far as Baluchistan).

The genus *Orychophragmus* was established by A. Bunge in the Mém. Acad. Sci. St. Pétersb. ii. 81 (1835) (reprint, p. 7), in his enumeration of the plants collected by him when attached to the Russian mission to Pekin in 1831. The one species, *O. sonchifolius*, which he described at that time, together with *O. Winkleri* (Regel sub *Moricandia*) O. E. Schulz, are the only known members of the genus. The former is distributed over the greater part of China; the latter appears to be unknown outside Buchara.

Bunge's plant had, however, unknown to him, been discovered nearly a century earlier. In the year 1916, O. E. Schulz, the present distinguished monographer of the Cruciferae for "Das Pflanzenreich," established the identity of Bunge's species with Linné's *Brassica violacea* [Sp. Pl. ii. 667 (1753)]. Linné had already described the plant in his Hortus Upsaliensis 191 (1748), as *Brassica foliis lanceolato-ovatis glabris indivisis dentatis*, where he also states: "Habitat in China, misit Cel. Gmelinus. Hospitatur in apricario, biennis. Flores violacei magni."

It is to be noted that Linné received the seeds of the plants grown in the University Botanic Garden at Uppsala from Gmelin. The latter subsequently, in his Flora Sibirica iii. 265 (1768), described an *Eruca foliis subtriangularibus ex sinuato-dentatis*, adding: "E semine sinico in horto academico [sc. Petropolitano] enata est. An est *Brassica violacea*, LINNAEI?" This surmise was correct, for doubtless the "semen sinicum" had been collected by Gmelin himself, and the plants grown at St. Petersburg and Uppsala therefore came from the same source. Gmelin's description of the plant is an excellent one, though his figure (tom. iii., tab. lxi.) is not so good. The third volume of the Flora Sibirica was edited by Samuel Gottlieb Gmelin, nephew of Johann Georg, the author, and appeared in 1768, its publication having been delayed by the death of the latter in 1755. The materials for the work had, however, been accumulated by the author in the course of his travels in Siberia and Northern China during the years 1743 to 1753. His "*Eruca*" was actually collected near Pekin, according to a note by Linné in Willdenow's Herbarium (no. 12212), so we are told by O. E. Schulz.

Such is the not uninteresting history of the discovery and introduction into cultivation of the plant now frequently known as *Moricandia sonchifolia* Hook. fil. The credit—if such it be—of transferring this species of *Orychophragmus* to *Moricandia* should not, however, be ascribed to Sir J. D. Hooker [Bot. Mag. cii. t. 6243 (1876)], since the transference had already been effected by Ledebour in the year 1841, when he published his "Commentarius in J. G. Gmelini Floram Sibiricam" in the Baier. bot. Ges. Denkschr. iii. 43-138 (Regensburg). The name will be found at the top of p. 108 of that work.

For several reasons, however, this transference can hardly be justified, and Bunge's genus should be upheld. Though the diagnostic character (seeds 1-seriate), upon which Bunge relied for

establishing *Orychophragmus* as distinct from *Moricandia*, is now known to be invalid (for both 1- and 2-seriate seeds occur in the latter genus), there are other points of distinction which appear to be constant. These may be summarised as follows.

| | <i>Orychophragmus</i> | <i>Moricandia</i> (and <i>Douepia</i>) |
|-----------|-----------------------------|---|
| Habit : | Herbaceous | Suffruticose |
| Leaves : | Membranous, sometimes hairy | Fleshy, or at least succulent, always glabrous. |
| Anthers : | Mucronate | Acute |
| Seeds : | Not winged | Narrowly winged |

The geographical areas of the two genera are also quite separate, as indicated at the commencement of this note, a fact which lends support to the case in favour of their distinctness.

In conclusion, an enumeration of the nomenclatural vicissitudes through which *Orychophragmus violaceus* (L.) O. E. Schulz has passed, may not be out of place.

[1743-1748. Discovered by J. G. Gmelin in Northern China.]

1748. *Brassica fol. lanc.-ov. glabr. indiv. dent.*, Linné, Hort. Upsal. 191.

1753. *Brassica violacea* Linné, Sp. Pl. ii. 667.

1768. *Eruca fol. subtriang. ex sin.-dent.*, J. G. Gmelin, Fl. Sib. iii. 265.

1769. *Raphanus violaceus* Crantz, Class. Cruciform. emend. 112.

1835. *Orychophragmus sonchifolius* Bunge, in Mém. Acad. Sci. St. Pétersb. ii. 81.

1841. *Moricandia sonchifolia* Ledebour, in Baier. bot. Ges. Denkschr. iii. 108 ; Hooker fil. (quasi de novo), in Bot. Mag. cii. t. 6243 (1876) ; E. Regel (Hook. fil. auctore citato), in Gartenfl. xxviii. 24, cum fig. (1879).

1916. *Orychophragmus violaceus* O. E. Schulz, in Engl. bot. Jahrb. liv. Beibl. n. 119, 56 ; et in Engl. Pflanzenr. Abt. iv. 105 : Hft. 84, 74 (1923).

XXXII.—*BEGONIA* *PLAGIONEURA*. E. MILNE-REDHEAD.

The determination of *Begonias* is frequently difficult even when the country of origin is known, owing to the great wealth of species in almost all areas in the tropics. When the native country is in doubt it is necessary to compare the whole material of the genus, as there is no monographic account of it more recent than 1864. The keys in floras utilize characters drawn from both the male and female flowers, and the absence of either is a bar to determination by this method. Hence it is not surprising that the *Begonia* described below, which has been in cultivation for at least thirty-five years, should not hitherto have been identified satisfactorily, since it has apparently never produced female flowers and its origin is unknown.

A specimen of this *Begonia*, which was in cultivation at Kew under the name of *Begonia debilis*—a very different plant from Malaya—was identified at the Herbarium, in 1895, as *Begonia*

Schottiana Alph. DC., a Brazilian species to which it bears considerable superficial resemblance. Subsequently, in 1925, it was found to differ in certain not very obvious but nevertheless significant characters, but it proved impossible to match it with any material in the Herbarium, and it was considered inadvisable to describe it as a new species in the absence of female flowers. As it is a valuable decorative plant, however, it seems desirable to give it a binary name, although the possibility that it may be a horticultural hybrid cannot entirely be excluded.

Begonia plagineura *Milne-Redhead*; affinis, ut videtur, *B. Schottianae* Alph. DC., a qua foliis longipetiolatis supra glabris, nervis lateralibus paucioribus obliquis, sepalis glabris facile distinguitur.

Frutex erectus, vix 1 m. altus, ramis elongatis, caule basi circiter 0.6 cm. diametro glabrato, basibus persistentibus pilorum delapsorum notato, cortice brunneo plus minusve longitudinaliter findente, internodiis 4.5–6 cm. longis; rami ascendentes, 30–40 cm. longi, flexuoso-anfractuosi, internodiis 1–3 cm. longis, densiuscule breviuscule villosopilosi, pilis basi incrassatis debilibus ascendentibus vel plerumque appressis; ramuli inferne pallide brunnei, superne subherbacei. *Folia* valde obliqua, sublanceolata, latere altero inferne valde gibboso, altero leviter curvato tantum, 3.5–7 cm. longa, 1.5–3.5 cm. lata, acuminata, basi inconspicue inaequaliter subcordata, margine conspicue undulato irregulariter repandodentato, tenuiter carnosa, supra glabra, subnitidula, impresses foveolato-punctata, nervo medio lateralibusque impressis, subtus nitidula, multiareolata, areolis albis, nervis satis prominentibus breviter appresse crispule villosis, mesophyllo glabro; nervi laterales latere uno 3–4 altero 4–5, obliqui, 1 vel 2 inferiores utrinque breves, secundus vel tertius supra basin utrinque valde obliquus, nervo medio subparallelus, in dentem marginalem $\frac{2}{3}$ supra basin excurrentis; petioli 1–2.5 cm. longi, villosopilosi; stipulae ovato-oblongae, 4–5 mm. longae, longiuscule mucronatae, membranaceae. *Pedunculi* 2–4 cm. longi, rubelli, sparse pilosi. *Cymae* semel furcatae, ramis circiter 0.5 cm. longis 4–5-floris; pedicelli glabri, supra basin constricto-articulati; bractee stipulis satis conformes, membranaceae, albae. *Flores masculi* tantum noti; torus parvus, hemisphaericus; sepala 2, suborbicularia (in alabastro subreniformia), circiter 1.5 cm. diametro, glabra, extus scintillanti-punctata; petala 2 (vel 3–4) anguste obovata, 1 cm. longa, 0.5 cm. lata. *Stamina* circiter 19; filamenta 0.5–0.75 mm. longa; antherae oblanceolato-oblongae, circiter 3 mm. longae connectivo thecae 0.7 mm. superante 0.8 mm. lato incluso, fere 1 mm. latae.

Shrub, erect, up to 1 m. high. *Stem* glabrous with brown bark splitting longitudinally, and long branches. *Leaves* very obliquely sublanceolate, acuminate, inconspicuously subcordate at the base, 3.5–7 cm. long, 1.5–3.5 cm. broad, slightly fleshy, glabrous except for curly villous hairs on the veins beneath; margin wavy, irregularly toothed; petioles 1–2.5 cm. long, villous-hairy. *Flowers* in

axillary once-forked cymes at the ends of the shoots. *Male flowers* white, 3 cm. in diameter. *Sepals* 2, suborbicular, about 1.5 cm. in diameter. *Petals* 2, or more rarely 3-4, narrowly obovate, 1 cm. long, 0.5 cm. broad. *Stamens* about 19; filaments short; anthers ob lanceolate-oblong, about 3 mm. long including the connective, which overtops the loculi.

Begonia plagioneura thrives best in a light loamy soil, and delights in a warm moist atmosphere where the temperature of the house does not fall below 55° Fahr. It is propagated by cuttings which root readily at any time of the year. It is very useful as a pot plant for decoration in the Conservatory.

XXXIII.—MISCELLANEOUS NOTES.

Exhibition of Drawings made by Professor Daniel Oliver.—Professor Daniel Oliver, F.R.S., F.L.S., LL.D., botanist and artist, occupied the position of Keeper of the Herbarium at Kew from 1864 to 1890. (*K.B.* 1893, p. 188; 1894, p. 78; and 1917, pp. 31-36). To celebrate the centenary of his birth an exhibition of his drawings and paintings has been arranged in a room in Museum No. 4 in the Royal Botanic Gardens, Kew. Professor Oliver's eminence as a botanist during the latter half of last century is well known: his ability as an artist, however, has not been so generally recognised. He was connected with the Herbarium from 1858, and during a considerable part of that time he was also Professor of Botany at University College, London. He took a prominent part in the work of the Royal Society, Linnean Society, and other learned institutions, and was able, therefore, only to indulge in his hobby, "art," during his limited leisure. However, by early rising and by taking full advantage of his annual leave, he cultivated his talent and kept alive his interest in drawing and painting until he was able to exercise it more fully during the 27 years of his retirement.

In his younger days he appears to have concentrated upon plant drawings, which he found a great aid to his scientific work, but later in life most of his leisure time was spent in sketching scenery and architecture. In the catalogue describing the 60 pictures shown, it is stated, "After he had reached the age of forty, his holidays became entirely given over to sketching. During the seventies these were largely spent in Jersey and France, as his parents had migrated to Jersey for their health. In France his chief interest was with the fine cathedrals and churches and especially in the mediæval sculpture; and later on he had a number of his studies of these reproduced in a series of 'Decades' entitled *Plant and Animal Forms by Workmen of the Middle Ages*, examples of which are here exhibited (Nos. 47 and 48)."

The pictures exhibited are chiefly water-colour and sepia studies of landscapes and architecture, which include drawings made in Northumberland, Westmorland, Jersey, France and other places.

The exhibition is termed "The By-products of a Botanist," and a foreword by Mr. Noel Rooke describes the peculiar characteristics of Professor Oliver's work.

"The present Exhibition has a twofold interest. The second is of much the greater importance; but the first, which may seem to concern the student only, should be noted by others as well.

Professor Oliver may be looked on as one of the last, perhaps the very last, of the English amateurs who was entirely free from the influence of photographic vision. He is, therefore, two generations distant from the present reaction against it, and is, of course, using a language which is entirely foreign to that which expresses the thoughts of to-day."

The exhibition is made by Professor F. W. Oliver, F.R.S., and the Misses Oliver, son and daughters of Professor Oliver, and in the preparation of the catalogue they have given brief descriptions of their father's life and work, and of the pictures exhibited. W.D.

Spartina Townsendii* in New Zealand.—The value of *Spartina Townsendii* H. & J. Groves in the consolidation of tidal mud-flats has been recognised in this country for a number of years. It is therefore of interest to read of the results obtained in New Zealand by planting this grass in an area very similar to those coastal zones in Great Britain upon which *Spartina* has proved so successful.

In 1913 a number of plants obtained from Southampton Water were planted in clumps on the mud-flats at Foxton in the tidal estuary of the Manawatu River, North Island. To-day the grass has spread considerably, the largest patch measuring 57 feet by 33 feet, a rate of spread quite comparable with that observed along our own coasts.

Dr. H. H. Allan's observations show that the grass behaves in New Zealand just as it does at Poole Harbour and other similar situations along our British Coasts. He notes that the grass rarely increases by seedlings but mainly by vegetative extensions of the clumps, and its inability to compete successfully with *Juncus* and other plants of the more consolidated mud confirms what has already been observed in this country.

In view of the suspected hybrid origin of *Spartina Townsendii* with *S. stricta* L. and *S. alterniflora* Lois. as possible parents, the discovery by Dr. Allan of a few tufts of a *stricta*-like plant in the main patch at Foxton is of interest. The suggestion is made that this plant is a segregate from such a hybrid, though this possibility is somewhat weakened by the fact that a few plants of *S. stricta* may have been originally planted in 1913.

These experiments in New Zealand serve once again to demonstrate the extreme usefulness of *Spartina Townsendii* in the reclamation of tidal mud-flats. The results of the dual action of this grass in binding the mud and in preventing sea erosion can be effectively produced in no other way. F.B.

*H. H. Allan in New Zealand Journal of Agriculture, XL. 189 (1930).